Pests
AND THEIR CONTROL
1944
AUGUST
VOL. 12 NO. 8

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Pests

and Their CONTROL

Exterminators, Fumigators, Termite Control Operators, Entomologists, Insecticide and Supply Manufacturers

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"Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of literary material pertaining to pest control and pests from any person interested in the advancement of the field."

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EDITORIAL

Are Fumigation Accidents Inevitable?

ONE OF THE more widely publicized "Good Domestic Fumigation Practices" of the NPCA stresses the importance of having watchmen guard the fumigated structure during the entire exposure period and initial ventilation, and until released by the fumigator. Despite this, fumigation casualties resulting from lack of guard facilities, continue to plague the Industry. Some recent accidents, outlined in Service Letter No. 331, are of definitive interest.

(a)—Two deaths; no guards; girl of 17 and younger brother sneaked into an empty house under fumigation; signs conspicuously posted.

(b)—House unguarded for six hours; no accident; accidents and deaths have occurred within the past year in this state and serious propaganda for legislation.

(c)—One death; fumigator was guarding but left fumigated house for luncheon and in brief half hour a youngster 8 impulsively tore open the door; one other person overcome; technically the local ordinance was not observed.

(d)—Hospital case due to victim being overcome with fumigant; person warned not to enter premises; no guard; fumigation was being done in upper floors.

(e)—Newspaper gave impression that fumigators were overcome doing a single room contrary to local ordinance. Ordinance does not prevent use of formaldehyde.

Some argue that in posting signs, notifying people and installing Safety Locks the use of guards may be dispensed with. That, as these casualties starkly attest, is a fallacy. And, as a matter of fact, a rationalization of the unwillingness or inability to absorb the added overhead that guards entail.

Competitive factors are, of course, at the root of the problem—admittedly not an easy one to solve. But unless this competitive dilemma is realistically approached the Industry will not only have to refund part of its "no-guard" savings in higher insurance costs. It will also find itself saddled with severely restrictive legislation—to say nothing of the harmful publicity.

Fumigation Suggestions

PETE BOHMAN of Hartford, Conn. has made a suggestion which has the approval of the Technical Committee of the NPCA. Warm or summer weather causes many fumigators to perspire and we all know that open pores make for absorption of cyanide, etc., and salt tablets have been found helpful in offsetting heat exhaustion, which might well be taken by fumigators. May we warn, however, that handling the tablet after handling poisons should not be done without making certain that the salt tablets have not been contaminated with poisonous baits, insecticides or sodium cyanide. Although it is recommended that gloves be worn during the handling of these materials, experience shows that we must not assume that the recommendations are universally followed.

The Chairman of the Technical Committee, C. A. Vincent-Daviss, included a cautionary comment which cannot be reiterated too frequently. To quote:

"One other factor comes up this time every year; namely, the possible absorption of HCN gas in damp clothing. The clothes can become damp from perspiration or from the weather. In either case, there is a tendency to pick up HCN gas when the fumigator is exposed to an atmosphere of HCN in ventilation, etc. Then later as the clothing dries, the gas is driven off and, in some cases, has been known to affect the individual so exposed. A caution along these lines might be helpful."

NPCA Service Letter No. 331.

Termite Terminology

AN EDITORIAL in the June 1944 issue of this magazine, based on a recommendation made by Robert Hackley, invited suggestions for a more inclusive name for the heading of inspection reports. From an unusually good friend of the Industry comes one or more such. Says he: "Since subterranean termites and certain kinds of ants sometimes infest poor grade or open foundations of materials other than timber, which must, in consequence, be part of any inspection of a structure, I believe 'Structure Inspection' might be suitable, or the term 'Inspection' should be entirely omitted and the inspection report headed 'Structure Deterioration.'"

The Navy V-Mail Service

THE NAVY V-MAIL SYSTEM, (now almost two years old) has expanded to the point where more than 7,000,000 pieces of V-Mail are handled each month. This represents an increase of approximately 560 per cent in the use of V-Mail in the past nine months.

Since the joint introduction of V-Mail by the Army and Navy on June 15, 1942, a total of 453,000,000 V-Mail letters have been delivered overseas by the two services. It is estimated that the use of this microfilm method of correspondence has saved or made available for other vital cargo, approximately 9,000,000 pounds of cargo space. As invasion day approaches, even more cargo space on both planes and ships will be required. The lives of many American boys will depend on the prompt receipt overseas of trained personnel such as doctors and nurses, as well as blood plasma, ammunition, spare parts, and hundreds of other items needed for war. The wider use of V-Mail by the public will help to speed the overseas delivery of personnel and supplies.

The Navy's V-Mail stations are mobile units that move into strategic areas with advancing combat outfits. They are spearheads of the postal service that move with fighting men into New Guinea and Attu, into New Caledonia and Samoa, into the farthest outposts where mail is the most important of morale-builders. Equipment to reproduce letters went into Tarawa with the second wave of assault troops. Eniwetok and Kwajalein became V-Mail depots within a day and a half of American action.

Forty such posts have been established by the Navy throughout the world during the past year, and equipment and personnel for 25 more are awaiting shipment.

Reasons for Using V-Mail

Actually there have been no outstanding changes in V-Mail since its inception. However, the Postal Service, wherever and whenever possible, have improved and streamlined every facility in connection with the V-Mail operation. The Navy's program differs from the Army's in that it is designed to serve the Marines and Coast Guard as well as the Navy, and the requirements are complicated by the rapid and frequent changes of locations that these forces constantly make.

The biggest point that is emphasized at the present time is the safety feature of V-Mail. After one year and ten months of continuous and growing service—not one V-Mail letter has been lost.

The most important point to be stressed is that now, more than ever, it is necessary to provide adequate space on both

surface vessels and airplanes. Armed Forces overseas mail has reached a tremendous volume of 40 million individual letters per week. As great a volume of this total of overseas mail should be converted to V-Mail as soon as humanly possible.

A good example of the cargo space saving features of V-Mail is as follows:

When V-Mail is used, TWO transport planes can do the work of 100 similar planes carrying the same number of standard and airmail letters.

A V-Mail letter weighs 1/140 as much as the standard letter, and its use effects a saving of 98 per cent in cargo space.

If all of us had used V-Mail since June 1942, enough space would have been saved to equip our forces with . . .

1,323,809 extra units of blood plasma
2,298,280 extra units of K-rations, or
62,209,392 extra rounds of 30 caliber cartridges.

The guaranteed delivery feature of V-Mail is highly important. Simply stated, the reason for the high safety factor is as follows:

All the original V-Mail letters are kept at the port of embarkation until film arrives at destination. If a plane flying V-Mail is lost, either by accident or by enemy action, the missing film is reported at once, the letters are rephotographed and the microfilm is sent on its way by the next available plane.

V-Mail has definite priority in handling by the Army and Navy Postal Departments over all other types of personal mail. **V-Mail is never left behind.**

The only V-Mail undeliverable today is that which is improperly addressed. Most of the improperly addressed V-Mail ultimately reaches the addressee due to the Navy's directory service. However, delays caused by improper addressing should certainly be corrected, for they always mean, at least, bitter disappointment to someone waiting so eagerly for word from home.

Here are some examples of the correct way to address mail to Naval personnel:

John James Roe, S1/c, USN
U.S. Naval Air Station
Navy No. 128 (ONE TWO EIGHT)
Fleet Post Office
San Francisco, California

John James Roe, Cox., USN
Submarine Repair Base
Navy 1925 (ONE NINE TWO FIVE)
Fleet Post Office
New York, New York

LIEUTENANT JAMES ROE, USNR
U.S.S. IDAHO
Fleet Post Office
New York, New York

NOTE: Use **FULL** name. **NO** initials, **NO** nicknames. Spell out Navy number in addition to writing the numerals, i.e. Navy 128 (ONE TWO EIGHT).

V-Mail information with respect to other branches of the Armed Forces will be published in first available issue after receipt.—Ed.

Attention

During the past several months there has been a heavy demand for back issues as well as those of late.

Since we have now run out of these issues, many renewals have come in requesting that we send them back issues—but sorry to say they are not available.

For the sake of those who are soon to renew, we would advise you to mail your renewals as soon as possible if you are to be assured of future issues.

Notice

The firm that has the classified ad in the July issue under Box 945, please write us since through an error, the letter has been misplaced.

N. P. C. A. Plans Significant Program For Its 12th Annual Meeting, Sherman Hotel, Chicago

October 23, 24, 25, 1944

AFTER CAREFULLY weighing the pros and cons of holding its Annual Meeting this year, the NPCA voted full speed ahead. Formulation of a program, geared to the war effort and the post-war world, is now in progress and will be published in a later issue.

Here are the themes the program will encompass:

(A) Tomorrow's Tools—material and methods—in preview and review
(B) Backwash of the War—insect-borne diseases and the PCO's place in the battle against these invaders
(C) One Common Language—standards that make sense to the PCO and to the public
(D) Back to a Racket—or on to a Profession? Enforcement or observance of accepted "good practices" and "Standards of Performance."

Well-informed speakers from the collateral fields of entomology, manufacturing, government and the Armed Forces will participate. Platform talks, however, will be kept at a minimum to allow maximum time for floor discussions. Meanwhile, if you have any $64-questions—or even less expensive ones—that you'd like answered, send them along well in advance to insure proper attention.

Cooperation is again requested from manufacturers and supply houses to take advertising space in the Official Program of the NPCA. To do so will keep your name before the real buying power of the Industry at a propitious time. "Program" will have a minimum circulation of 1500 and it will be sent to NPCA membership regardless of attendance. Advertising rates are:

Full page	$25.00
Half page	15.00
Quarter page	10.00

Since preferred positions will be allotted in the order advertising reservations are received, it is urged that you send your copy instructions promptly. Checks should be made payable to the National Pest Control Association and mailed to William O. Buettner, Secretary, 3019 Ft. Hamilton Parkway, Brooklyn (18), N. Y.

Hotel reservations should be made without delay. Write the Hotel Sherman—Annual Meeting headquarters—on your own letterhead, since the usual self-addressed cards will not be available this year. Be specific as to your room requirements, mentioning that your reservation is in connection with the 12th Annual Meeting of the NPCA. Moreover, be sure to include **date of arrival.** Rates (all rooms provided either with bath or shower) follow:

SINGLE: $2.75; $3.30; $3.85; $4.40; $5.50.
DOUBLE: $4.40; $4.95; $5.50; $6.60; $7.70.
TWIN BEDS: $4.95; $5.50; $6.60; $7.70; $8.80.
SUITES: $8.80; $11.00; $13.20; $16.50 and up.

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DDT as a Residual Spray for the Control of Bedbugs[1]

A. H. MADDEN, ARTHUR W. LINDQUIST *and* E. F. KNIPLING[2]

A LARGE PERCENTAGE of the bedbugs in an infested building remain concealed and protected when sprays are being applied. The degree of control obtained must therefore depend to a large extent upon the toxicity of the resulting deposit on walls, floor, and beds, with which the bugs come in contact when they leave their hiding places. Furthermore, the residue must retain its toxicity for an extended period to prevent early reinfestation through the hatching of eggs or introduction of additional bugs.

An investigation was conducted at Orlando, Fla., beginning in September 1942, for the purpose of finding a material with persistent insecticidal qualities. Approximately 1,500 laboratory tests with about 100 materials were completed, and DDT, first tested in January 1943, was found to be the most outstanding, with pyrethrum somewhat less effective. The results obtained to date with DDT under both laboratory and practical conditions are given here. A few results with pyrethrum also are given for comparison. The tests were conducted against a mixed population of the common bedbug, **Cimex lectularius** L., and the tropical bedbug, **C. hemipterus** F., but no difference in resistance was detected between the two species.

Jar Tests.—In initial laboratory tests circular woolen pads of the same diameter as the inside of a half-pint fruit jar were sprayed or dusted on both sides with the test material, 0.25 milliliter of liquid or 0.8 gram of powder being used per pad. Five normal adult bedbugs were placed in a jar and exposed to a treated pad for 15 minutes. The pad was then removed and the bugs were held for mortality counts 24 to 96 hours later. Fresh bugs were exposed to treated pads as long as complete mortality was obtained. Each test was run in triplicate.

Five per cent of DDT in a mixture of dimethyl phthalate and acetone and 1 per cent of DDT in deodorized kerosene gave complete mortality up to 39 days after application. A dust containing 0.3 per cent of pyrethrins and an activator in pyrophyllite gave complete kill for 2 days after application and partial kill up to 49 days, and a dust containing 5 per cent of DDT in various diluents gave complete kill up to 49 days and 87 per cent mortality 56 days after application.

Cage Tests.—In order to simulate natural conditions more closely, further tests were conducted in cages with glass sides and unpainted plywood top and bottom, 30 by 30 by 31 inches inside dimensions. Each cage contained a miniature mattress and was fitted with demountable unpainted wooden walls extending halfway up the inner sides and providing many places of concealment for bedbugs. Spray was applied to the mattress and lower half of a cage at the rate of 100 to 150 milligrams per square foot of surface. Fresh bedbugs were introduced at weekly intervals after spraying and exposed for 48 hours.

In these tests 20 per cent of DDT in ortho-dichlorobenzene applied at the rate of 100 milligrams per square foot gave complete mortality 73 days after treatment. Previous jar tests had shown that orthodichlorobenzene alone gave no residual kill. It is noteworthy that in a cage receiving the same treatment but scrubbed with hot water and soap 8 days later 100 per cent mortality was obtained 78 days after treatment. A spray containing 0.5 per cent of pyrethrins plus 2 per cent of N-isobutylundecylenamide in deodorized kerosene applied at the rate of 2.5 milligrams of pyrethrins per square foot gave kills from 60 to 80 per cent up to 22 days after treatment and after that time was practically worthless.

Practical Tests.—A number of practical tests in infested houses have been initiated, the majority of which are still in progress. Sprays are applied to a bedstead, springs, and mattress, and to the floor and walls near the bed. In these tests not only are the treated beds subject to normal reinfestation, but in addition fresh bugs are introduced at weekly intervals and recovered 48 hours later. The most important of these tests are summarized in table 1. Although the longest period of protection has been obtained with a 20 per cent concentration of DDT, it is believed to be mainly because this solution was applied during the early stages of the investigation and thus more time has elapsed since the material was applied. The passage of time may show that the 5 per cent concentration affords complete protection for a comparable period.

Table 1.—Duration of toxicity of DDT spray residue to bedbugs when applied to beds in infested houses.

Spray	Amount of Solution Applied	Time After Treatment That 100% Mortality Was Recorded
	Milliliters	Days
20% of DDT + 40% of orthodichlorbenzene in deodorized kerosene	140	281
5% of DDT in kerosene	195	64
	250	84
5% of DDT aqueous emulsion[1]	250	133
10% of DDT + 5% of cyclohexanone in kerosene	250	104

[1]25% DDT + 25% Wetsit (alkylated aromatic sulfonate) + 50% xylene, emulsified in 4 parts of water.

In several small tests in army barracks located in Florida, 5 per cent of DDT in kerosene has been effective for several months. A large-scale practical test with the same solution is now in progress in central Florida involving the treatment of about 80 barracks, some of which were heavily infested. Complete freedom from bedbugs has been recorded for nearly 4 months.

Although a number of effective solvents and concentrations of DDT have been found, it is concluded that from a practical standpoint 5 per cent in crude kerosene is probably the most satisfactory to use, particularly under military conditions. Kerosene is cheap, almost universally available, reduces the fire hazard, and will not cause staining. The solution should be applied in the form of a coarse spray in sufficient quantities to obtain a heavy, even deposit of DDT. To insure the most lasting results at least 100 milligrams of DDT should be applied per square foot.

[1]Work done at the Orlando, Fla., laboratory.

[2]Acknowledgment is made of the assistance of Howard A. Jones on the chemical aspects of the problem.

—*Journal of Economic Entomology, February*, 1944.

War Manpower Commission Rules

1. Employers in non-essential industry may not hire a worker previously employed in **essential** industry without a Statement of Availability and a referral card from the U.S.E.S. of the W.M.C.

2. Employers in non-essential industry employing four or more persons may not hire any male workers between 18 and 45 years of age previously employed in **non-essential** industry without a referral card from the U.S.E.S. of the W.M.C.

3. Employers in essential industry may hire any worker previously employed in essential industry if he has a Statement of Availability from his last previous employer or from the U.S.E.S. of the W.M.C.

4. Employers in essential industry may hire any worker from non-essential industry without a Statement of Availability and without a referral card from the U.S.E.S. of the W.M.C.

5. Critical workers and shipyard workers must have a Statement of Availability and a referral card from the U.S.E.S. of the W.M.C. in order to secure any other job.

THE PRINCIPLES OF RAT CONTROL

By GEORGE B. LAY
U. S. Fish and Wildlife Service, Boston, Mass.

(An address for delivery at the Canadian Pest Control Association Convention, Montreal, Canada, February 21-23, 1944.)

IN CONDUCTING and supervising pest control operations, the Fish and Wildlife Service of the United States Department of the Interior has found that any properly balanced program designed to eliminate rats must be based upon three essentials, regardless of whether the program is to be conducted in a city or in a rural area.

These three essentials are: (1) A survey must be made to ascertain the extent of the problem, (2) Actual remedial measures must be taken to reduce the rat population, and (3) In order to keep the economic losses and menace to health at a minimum, the premises must be regularly reinspected and maintained in a rat-proof condition.

Pest control operators will do well to follow this suggested three-point program as carefully as the supervisor of a city-wide project for rat elimination.

From experience, we have discovered that it is best to use survey cards, on which to jot down pertinent data, when making the survey, in preference to relying entirely on one's memory. All the essential data concerning the locality, type of establishment, and the premises involved should be recorded on these cards for ready reference.

When these cards are completed, you should have some idea as to the extent of the rat population, the amount of damage done, and the way the rats get in and out of the buildings and from one room to another within the building itself. Based on this information, you can then plan your elimination program with greater chances of success. Special observations may be required at times to give a clear indication of the rat population, particularly in large buildings.

You will find, undoubtedly, that no two surveys—even of two similar buildings—will produce the same information. You will find also that a great variation exists in making a survey for a food-handling establishment, even among several establishments of a similar type located in one building. The survey, when completed, may not be as worthwhile as it should be if all vital items are not filled in on the survey cards. It is possible, of course, to fill in every single blank on a given survey card and accumulate data that while it is extremely interesting, will not, however, materially help towards solving the problem, but this is not often.

The subject I want to discuss first is sanitation. It is axiomatic that neither the pest control operator, nor anyone else, can effect a remedy without first removing the factors which naturally favor the rat. Where the premises are kept clean, few rats will be found, or mice either, for that matter. Cleaning up premises would not necessarily cause the rats to leave, especially if food and water remain unprotected and obtainable. It is realized that rats will be found in many well-kept buildings, which cannot be closed completely because of the continued shipping and receiving of goods. Rats and mice seem to find countless ways of entering buildings during the day, particularly when the days are dark and when men are working with the aid of lights at loading platforms and at entrances and exits which cannot be kept constantly closed.

One of the first points your survey should bring to light is whether or not the building is unsanitary. In order to obtain an area that is sanitary, rats must not be permitted access to available supplies of food and water. Likewise, garbage, rubbish, and other trash should not be allowed to accumulate in open containers or piles which give rats food, a refuge, and a place where they can feed, live, and breed. Improper handling of trash and garbage is one of the prime reasons why we have unsanitary areas, and why rats continue to exist.

Little can be done to permanently control the rats on a rat-infested area unless garbage and trash are properly and frequently removed from the premises by the town or city, or disposed of by the farmer. Although rats may be reduced somewhat by killing, if unsanitary conditions prevail, other rats will seek such inviting areas and the rat population will soon return to the carrying capacity, based on the food, water, and breeding places of that area.

It is not only necessary to remove and dispose of garbage and trash regularly (daily is best), but garbage in its containers must be excluded from rats and the containers kept in protected locations during the intervals between collections. This means that garbage containers must be durable and must have tightly fitting tops. They should be placed a foot or more above ground on a platform and held firmly upright so as to prevent rats from tunneling underneath, and to prevent dogs from overturning the cans. Garbage containers which are sunk into the ground in concrete-lined pits must be protected with a concrete bottom to such a pit.

Another thing to guard against is the mixing of garbage with burnable trash. Unburnable waste material such as bricks, bottles, sand, ashes, and tin cans should always be separated from the burnable wastes. The occupant of the building, whether living in the city or in the country, should keep all waste material separated in these three classes. Janitors in apartment buildings should take garbage from all apartments to an outside garbage container, at least once a day.

At this particular time, when both our nations are engaged in war, such a separation of waste materials permits the easy salvage of tin cans, metals, waste paper, and cardboard.

Many cities have adopted the progressive practice of requiring that garbage be wrapped in paper and each package securely tied, before placing in garbage cans. Other methods of garbage disposal such as the fine grinding of garbage and its disposal down the drainpipe, the installation of processing plants to extract valuable materials from waste garbage and various types of home incinerators, are now being considered.

Under the second step in our three-point program, I want to talk about ratproofing and the actual elimination of these pests. Ratproofing means constructing buildings so that rats cannot get into them. Ratproofing in the broadest sense embraces not only the exclusion of

rats from buildings of all types but also the elimination of their hiding and nesting places and cutting off their food supply within and without the building. It can also include prevention of rat movement from one room to another within a building. Through open doors and in other ways, rats may frequently gain access to structures that are otherwise ratproof, but they cannot persist there unless they find safe retreats and food. When ratproofing becomes the regular practice, the rat problem will have been made much easier. Permanent freedom from rats, however, should be the goal of everyone troubled with the pests, and ratproofing offers the best means to this end.

Pest control operators who really want to have satisfied customers will include ratproofing as a part of any rat job they handle. Just the killing of rats will not satisfy the public. The home owner and the business man want more than temporary relief from rats—both want as nearly complete and permanent a solution as possible of their particular rat problem. If this means ratproofing, then it is up to the pest control operator to do it, if he wants to build up his business. Many ratproofing problems involve little expense. After the rats are eliminated from premises, the operator should reinspect in order to maintain that condition.

Under the subject of elimination of rats I am going to discuss four methods, (1) baiting and poisoning, (2) gassing or fumigation, (3) trapping, and (4) miscellaneous methods such as shooting, repellents, etc.

A book could easily be written about baiting and poisoning, describing all the different kinds of food materials, poisons, formulas, and giving other pertinent information. It has been learned through studies made by the Fish and Wildlife Service that rats require annually about 50 pounds of corn or its equivalent. This means about 2 ounces every 24 hours for the average size rat. They will destroy by wastage and contamination about twice as much as they actually eat (see page 7, Fish and Wildlife Service Wildlife Circular 6—"The House Rat") The rat's appetite varies and is influenced by the available food supply. The damage it does to packaged goods is generally for the purpose of obtaining the food in the package, however it may be to get the mucilage used in making the carton or to get material for nests. Rats and mice often destroy clothing and cloth in bolts to get material for their nests.

The efficacy and reliability of poison baits is a subject in itself. At the outset, however, I want to make it clear that no poison is of any value in rat control unless the food material in which it is mixed is eaten by the rats. Your first problem, therefore, is to find out what food or foods are preferred by the rats at a given point or area, and cater to this preference. It is quite often true that prebaiting is not required, as it is usually possible to find damaged food materials. The cost of prebaiting naturally increases the cost of the initial work but it does increase the efficiency of control and may eliminate future service calls. This is a point that I cannot stress too strongly. Undoubtedly the use of poison baits is the most economical, fastest, and most efficient means of controlling rats, except when conditions are out of the ordinary. It is recommended that only one toxic agent be used in the exposure of different kinds of bait materials at one time. It is better to rotate the use of different toxic agents. There are several bulletins available describing effective poison bait preparations and the best ways of applying them. Bait placement is usually not recommended above the ground floor of a building. Where there is food available above this floor, it may be necessary to bait additional floors.

Another means of control might be mentioned. This is the use of poison solutions that cannot be transported by the rats. Arsenic is the material which so far has been most successfully used. It is dissolved in water or milk and the liquid exposed where rats may get to it. In some places this method has worked fairly well. Domestic animals and human beings must be protected, however.

The second method that I have listed under elimination is that of gassing, or fumigation. Gassing is a method which ordinarily can be used with satisfaction only in particular locations. Gassing can frequently be used in structures for an unusual condition within the building but should always be done by men trained in handling fumigation in buildings. Here again it may be stated that ratproofing is a necessary follow-up of gassing or fumigation, just as much as it should be a follow-up after the use of poison baits. There are several gases which can be used in this method of elimination but it must be remembered that since all of them are poisonous, the public should be thoroughly informed of this fact so that every care can be taken to prevent accidents.

Trapping, the third method, is usually a follow-up to both poison baiting and gassing. Sometimes, however, a few well-placed traps will eliminate a light infestation of rats. In order that trapping may be effective, an adequate number of traps must be used, and they must be properly placed and attended frequently. The best trap is the wooden base snap trap. This is inexpensive, easy to handle, and is easily kept in working condition.

Trapping includes the use of traps with and without bait attached to the triggers. Frequently it is possible to do a better job with unbaited traps than with baited ones. Better catches will result by enlarging the trigger of the snap trap. This can be done by soldering a piece of sheet metal to the trigger or by attaching a piece of cardboard. I still live in hopes that some day I will learn of an enterprising rat trap manufacturer who has built a trap with the surface of the trigger considerably enlarged.

Man-made runways will also help to increase the catch. This is done by placing boards, boxes, and crates near the walls of a room so that rats can run behind them, and then placing the traps with trigger ends against the wall so that the rats will have to run over the trigger in travelling along the runways. Often by nailing a snap trap to the plate supporting the roof so that rats are forced to cross the trap in running along it or around a rafter, many will be caught, particularly in barns, poultry houses, and similar buildings.

Covering wire cage traps with burlap or other material, except for the two ends, will increase the likelihood of catching rats in such traps. Prebaiting traps while they are wired to prevent snapping will often prove effective since the rat will be lulled into believing that he can rob such traps without getting caught. Fine wire will do this and a pair of pliers may be used to put the trap into operation without the operator touching the trap or removing it from its location.

Under the heading of miscellaneous means of elimination, shooting and repellents have been listed. Dogs and cats might also be listed. The smell of a cat may be a repellent to rats and mice—particularly to mice—if the rodent population is small, but since cats are relatively poor ratters, they should not be depended upon. In addition, it is a lazy method and its use may blind the farmer or city dweller to the active need for sanitation, ratproofing, and poison baiting.

A pair of small dogs around the place will often help to cut down the rat population, but here again you

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do not have the real solution to your rat control problem. Shooting rats on city dumps is an activity in which sportsmen often indulge, but in spite of this the dump still remains as a breeding place for the pests and the population of rats has not been decreased an iota. Shooting in buildings, of course, may be dangerous and should not be employed as an elimination method.

Although repellents may do some good temporarily, unfortunately, we still know too little about them and, so far, we have been unable to find any really effective ones. The U. S. Fish and Wildlife Service is continually conducting research on repellents but, generally speaking, it has been found that such materials do not repel if the rat population is large. Repellents seem to be valuable only where the sanitary conditions are good and where the building is ratproof, or nearly so. At this time experiments are being conducted on the use of several materials which bear some promise of repellent value—powdered sulphur and superphosphate. Powdered sulphur is known to have some value when mixed with grain in the proportion of 4 pounds to the ton. Poultry raisers who sprinkle superphosphate on the perches, dropping pits, floors and wherever hens walk about in henhouses are finding that the rats dislike this repellent and in many cases will leave the premises. But, you must remember that these rats do not die but only take up their headquarters elsewhere. This is true of all repellents—the repellent only drives the rats to some other place. The use of repellents is also a job that has to be done time and again, even to be partly effective, and all that costs money and requires manpower.

The method of protecting baits and traps so that human beings, dogs, cats, poultry, wild birds, and stock will not be harmed is a subject in itself. It really seems to be up to the individual to exercise his ingenuity and devise his own means of protection. The services of an experienced person would prove of real value in this connection. In many cases the problem can be solved by placing crates or boxes with holes in them over traps and poison baits. The injury or death of animals and human beings can be prevented by excluding them from buildings or areas that are being treated.

This second point of the three-point program has been a long one for me to cover but the third point—that of reinspection and maintenance—now comes in for a few words.

Rats are continually on the alert to defeat the best laid plans any man ever made to eliminate them. Rats, apparently, never give up. Even though they are excluded from many a building, time and decay will aid them in their never-ceasing efforts to gain entry. Because of this fact, reinspection at regular intervals is vitally important.

If upon reinspection it is found that the problem still exists, then the program of control must be maintained. In making a reinspection we find that the use of survey cards is highly important as the reinspection card can then be filed with the original survey card and this will give the operator a complete history of each particular case.

On every reinspection, unless the problem is completely solved, some record should be made of the conditions existing, and of course a record should be kept of the ways and means taken between reinspections to control the problem.

If you keep accurate records of your original survey, the procedures and materials used when you first tackled the job of rat elimination, reinspections and the procedures involved between such inspections when control is attempted, you should be able to learn where you have made mistakes in method and where you have been successful. Pest control operators will find this information to be invaluable.

It has been a great pleasure to have had this chance to talk to you today and I hope that some suggestions have been given that will help in the rat control problem.

It has also been a pleasure to have had some small part in unifying the efforts of our two nations for the control of this age-old enemy of mankind. In closing I want to leave the thought in your minds that this slogan gives—"It is not a disgrace to have rats but is is a disgrace to keep them."

I thank you.

PCO Quiz—No. 6

Multiple choice questions. You are to check the correct answer. Score yourselves 4 points for each correct answer. Consider yourself above average if you score 80, and average if you score 64. Check the correct answer.

51. The name instar is applied to the (1).....insect between molts, (2).....a chiseling pest control operator, (3).....the resting stage of an insect with complete metamorphosis, (4).....the shedding of the insect's skin.
52. The reaction of an insect to light is called (1).....chemotropism, (2).....thigmotropism, (3).....phototropism, (4).....thermotropism.
53. Parthenogenesis is (1).....reproduction by the laying of eggs, (2).....reproduction without fertilization of the female by the male, (3).....the giving of birth to young, (4).....a town recently captured by the Russians, (5).....the time it takes an egg to hatch.
54. A clothes moth has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
55. A cockroach has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
56. The black carpet beetle has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
57. The silver fish has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
58. The dog flea has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
59. A housefly has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
60. A bedbug has (1).....no metamorphosis, (2).....incomplete metomorphosis, (3).....complete metamorphosis.
61. The termite has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
62. The little red ant has (1).....no metamorphosis, (2).....incomplete metamorphosis, (3).....complete metamorphosis.
63. The covering of the pupa of the housefly is called (1).....cocoon, (2).....puparium, (3).....ecdysis, (4).....stadium, (5).....eclosion.
64. The covering of the pupa of the clothes moth is called (1).....cocoon, (2).....puparium, (3).....ecdysis, (5).....stadium, (5).....eclosion.
65. Insects breathe through openings on the (1).....antennae, (2).....legs, (3).....abdomen, (4).....head.
66. The typical adult insect has (1).....4, 2).....6, (3).....more than six, legs.
67. Spiracles are the (1).....feet, (2).....breathing pores, (3).....nerve centers, of insects.
68. A female rat will produce litters of young on the average of about (1).....3, (2).....6, (3).....10, (4).....16, times a year.
69. A female rat will have about (1).....3, (2).....5, (3).....10, (4).....15, (5).....22, (6).....26, young in a litter.
70. Rats will breed when (1).....2, (2).....4, (3).....6, (4).....8, (5).....10, (6).....12, months old.
71. The period of gestation in rats is (1).....6, (2).....12, (3).....18, (4).....23, (5).....28, days.
72. A rat can jump vertically as much as (1).....5, (2).....15, (3).....25, (4).....35, (5).....45, inches.
73. The largest recorded brown rat weighed (1).....12, (2).....17, (3).....25, (4).....32, (5).....40, (6).....48, ounces.
74. A rat will rarely burrow deeper than (1).....10, (2).....18, (3).....24, (4).....30, (5).....36, (6).....48, inches.
75. The active toxic ingredient of Cubi is (1.....Degulin, (2).....DDT, (3).....Pyrethrins, (4).....Thiocyanate.

(For Correct Answers See Page 33)

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Toxicity: Insecticidal Effectiveness of DDT Against Structural Insects Discussed by Doctor Froelicher

Material which follows was excerpted from a talk made by Dr. Victor Froelicher, of Geigy & Co., before the mid-year meeting of the NAIDM, Chicago, June 12, 13. Explanatory notes apropos the terms GNB-A-DDT, Gesarol, Neocid—names under which DDT insecticidal compositions have appeared in literature during the past year—were published in July Pests (p. 8).—Ed.

THE MEMBERS of this association are principally interested in the use of DDT compositions against insects affecting man and animals and in household pests. We will therefore not dwell on the many problems which have already been, or are still to be solved in connection with plant pests. It will be many months, possibly years, until we have fully explored the many possibilities of insecticides containing DDT in agriculture. It is sufficient to state that in spite of the cheapness and effectiveness of many of the inorganic agricultural insecticides, Gesarol undoubtedly will have its place because of its extraordinary stability, effectiveness, and, if applied properly, its freedom from plant injury. Because it is a stomach as well as a contact poison, it has unusual versatility.

Many similar problems are met in non-agricultural fields and it may be interesting to you to study the action of DDT in insecticidal compositions which Geigy calls by the generic name of Neocid. The **housefly,** (Musca domestica), and the **stable fly,** (Stomaxys calcitrans) are the most common pests we have to deal with in everyday life.

The first paper to appear in an American magazine giving details about the effectiveness of DDT compositions appeared in "Soap and Sanitary Chemicals," December 1943, entitled, "Fly Control in Stables." It tells in substance what had already been reported to the Bureau of Entomology & Plant Quarantine. This report indicated that the walls and ceiling of a stable which had been sprayed with a 1% aqueous dispersion of a 5% concentrate left the stable free of flies for more than a month. FREE OF FLIES! This is exactly what the original Swiss report claimed in 1942 and which made everybody shake his head. In the meantime we have had time to check and recheck this claim, and believe it or not, we found it to be a fact. This was most spectacular! Flies walking over a deposit of Neocid containing 5% active ingredient, (which had been applied in a dispersion containing 0.05% DDT) were permanently affected and although they did not die instantly, they were doomed. There was no escape. A single contact with the residue seemed enough for their destruction.

Further investigations made since then have revealed that flies are provided with very delicate receptors on the tips of their legs. Contact with DDT affects their nervous system, undoubtedly through those delicate nerve receptors. At first, a short period of extraordinary excitement is noticed but soon a progressive paralysis sets in, first affecting the rear extremities and finally the remainders. It is difficult for the insects to walk straight although they can still fly. They eventually fall on their backs and die. There is NO escape although the insects may live as long as 24 hours. By the way, this physiological excitement gave rise to the coinage of the expression—"Gesarol Jitters." Incidentally it might be mentioned here that in some insects, like the common May beetle, which can swallow arsenates without being affected, DDT reacts in a different way. These insects do not have the delicate nerve receptors on the tips of their legs, but if they get 1 or 2 mouthfuls, the nerves operating their mandibles and digestive tract become paralyzed; they are no longer able to chew their food and die of starvation.

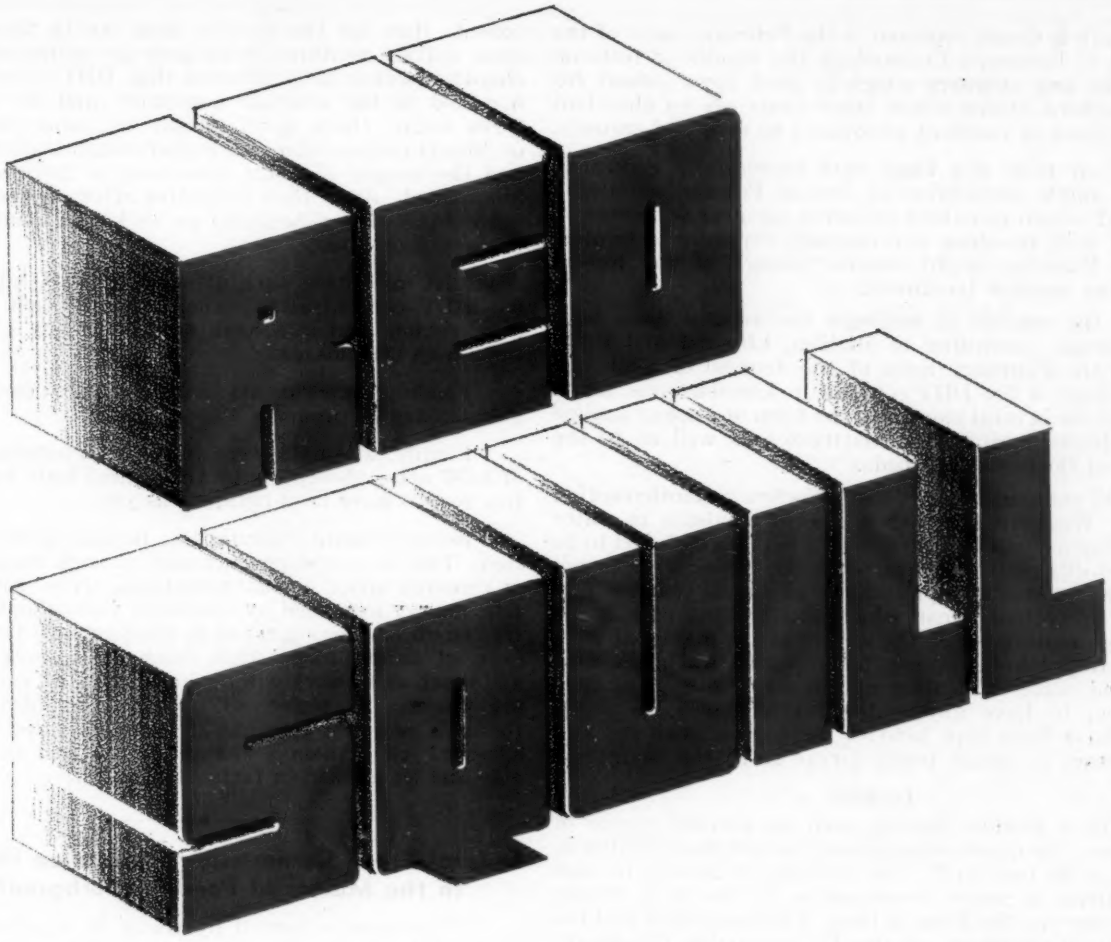
From this description it may be noticed that Neocid is slow-acting. Apparently it also has no repellent effect. Government entomologists are rather enthused over this because they do not want to chase flies away only to have them multiply on the neighbors' premises. They are KILLED and the effect of a single application will last from 1 to 3 months depending upon the quantity deposited.

We must keep in mind the main characteristics of DDT in fly sprays, namely: slow knockdown and sure kill. It therefore seems obvious that although it may be an AA fly spray, it does not replace Pyrethrum nor Thiocyanate, but complements these products. A combination spray seems to give us the ideal fly spray of the future.

1 Gm DDT in 100 cc base oil gives a kill of 95-99% in 24 hours, and the knockdown is 94-99% which would give a rating of 0-AA. (Zero in some cases where the knockdown in 24 hours fails to reach the required limit.) The fractional knockdown reveals some very interesting figures. Up to 7½ min. the knockdown is rather poor whereas during the following 2½ min. the increase is substantial and in most cases reaches a satisfactory figure. This shows that DDT does not have sufficient dramatic knockdown for a household spray although it may show an AA rating. It is therefore desirable to combine DDT with Pyrethrum or Thiocyanate which will not only result in a considerable saving but also on a superior fly spray.

Numerous tests with Neocid preparations against **cockroaches** have been made in the laboratory and in the field. A 5% powder has been tried in private homes and large restaurants. When properly applied, it was found to give extremely satisfactory control, owing to its unusual residual properties. The following observation by the owner of a large restaurant which had been treated with a 5% Neocid powder, is typical: after having applied the powder with a hand duster, they complained a couple of days later that the insects ran all over the place and the situation seemed entirely out of hand. However, a few days later the report came through that the roaches had completely disappeared and no dead roaches were found. This was unlike the results obtained with other roach powders because with these, dead roaches were found in the food. Their breeding places were also made uninhabitable with Neocid, more or less permanently, because 4 months after this small quantity had been applied, it was reported that only an occasional large roach was seen, which might have come from the outside. No young roaches nor egg-bearing females were seen and the proprietor of the restaurant wanted to know after 6 months whether any more of the "miracle powder" was available.

Ants can also be successfully controlled.



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Smith & Gouck reported in the February issue of the Journal of Economic Entomology the results of tests on **dog ticks and chiggers** which is good news indeed for our Southern States where these pests are so abundant and a source of constant annoyance to men and animals.

In our tests **dog fleas** were successfully controlled with a single application of Neocid Powder containing 5% DDT which remained effective for over 6 months in spite of daily brushing and constant exposure to reinfestation. Washing might remove enough of the Neocid to require another treatment.

In the control of **bedbugs** the results have been phenomenal. According to Madden, Linquist and Knipling, in the February issue of the Journal of Economic Entomology, a 5% DDT solution in kerosene was found effective for several months in the form of a spray applied to bedsteads, springs and mattresses as well as to the walls and floor near the beds.

DDT compositions are also effective as **mothproofing agents.** Wool treated with a Neocid emulsion in water containing as little as 0.0005% or 5 mg/L was found to be satisfactorily resistant to carpet beetle larvae when tested according to standard procedure. In actual practice regulation army underwear which was treated with a 2% emulsion, (calculated on the weight of the material) gave satisfactory results even after repeated washings with soap and water. Weathering for over 2 months does not seem to have any material effect whereas goods which have been kept indoors for over a year are still as resistant to carpet beetle larvae as at the beginning.

Toxicity

With a product having such an unusual range of usefulness, the question uppermost in everybody's mind is, "What is its toxicity?" The toxicity of Neocid to man and animals is under investigation by the U. S. Public Health Service, the Food & Drug Administration and the Kettering Laboratory of the University of Cincinnati. The last mentioned research is being sponsored by Geigy.

At the time the Gesarol preparations were first received in this country, Geigy Switzerland had already investigated and indicated moderate toxicity to man and warm-blooded animals. This was indeed a surprising statement considering the effectiveness against various insects and high toxicity to man of other insecticides like nicotine and lead arsenate. Although these reports emanated from Swiss Universities and private laboratories, they could not be accepted here without thorough investigation. We have some data today which indicate that the Swiss might be right in the assumption that between 5 and 7½ Gm DDT cause no toxic symptoms if taken by mouth. But it is only an assumption and we have not been able to prove it as yet. The only fact which we have been able to prove up to now is that DDT in the dry form is not absorbed by the skin and that it is non-irritating. Millions of men and women have been treated with the 10% louse powder without apparent harm to a single individual as far as we know. It has been reported however that DDT is definitely toxic if taken by mouth. If dissolved in oils or solvents it may be absorbed through the skin and long exposure may cause toxic symptoms. There does not seem to be any practical difference in the toxicity of the pure and the recrystalized product.

It will not mean much to the average individual if we tell you that the lethal dose (L.D. 50) by mouth in rats is 0.24 Gm/Kg when dissolved in olive oil and 2.1 Gm/Kg if suspended in milk. It just proves that the toxicity of DDT depends largely upon the vehicle in which it is dissolved. How far the toxicity data can be transposed to man, nobody ventures to express an opinion today. We should however keep in mind that DDT is not used by nor sold to the ultimate consumer, and, as far as we know today, there is no reason for using any Gesarol or Neocid composition in a higher concentration than 5% and the danger of acute poisoning is therefore greatly diminished. As to the cumulative effect, no results have been obtained to date as far as we know, to show that it has any such effect.

Whilst mice have been affected by dust inhalation of 5% DDT concentration, other animals such as guinea pigs, rabbits and cats have not shown any toxic symptoms with this dosage.

Feeding experiments with Neocid insecticides to animals are in progress.

Finally, attempts were made to determine the fate of DDT after absorption by the animal body but no positive results have been obtained as yet.

Before closing I should like to utter a word of caution. This is a new product and as such requires years of research under normal conditions. True, with the terrific energy expended by scientists throughout the country, much has been learned in the past two years. However let us not forget that much more work is needed and much more work will be done before all ramifications are known. Moreover, let us also remember that the Gesarols and the Neocids are not cure-alls. They are specific! Give them a chance to be tried in the right way and let us deal in facts, not fiction!

Federal Trade Commission Stipulation (No. 3844) In the Matter of Per-Mo Mothproof Co.

"It is hereby agreed by Oscar S. Schaffer [an individual, trading as Per-Mo Mothproof Co., Kansas City, Mo.] that in connection with the advertisement, offering for sale, sale or distribution in commerce, as commerce is defined by the Federal Trade Commission Act, of his insect poison [X-365] his rodent poison [Per-Mo Rat and Mice Exterminator], or of any other preparations composed of substantially the same properties, he will cease and desist forthwith from:

"(1) The use of the word "Exterminator" as part of or in connection with the trade name of either of said preparations; and from the use of the said word, or of any other word or words of like meaning or similar implication, the effect of which tends or may tend to cause the impression or belief that the said preparation, when exposed in premises that are infested with the aforesaid pests, would effectively attract or lure them to feed upon the product to their extermination;

"(2) From representing, or placing in the hands of others a means to represent, directly or inferentially, by means of statements or in any manner,

(a) That the use of the product called X-365 will kill or completely rid premises of roaches, waterbugs or ants, or will effectively control such insects within ten days or any other period of time;

(b) That the use of the so-called Per-Mo Rat and Mice product can be depended upon to cause sure death to all types of rats and mice, or to rats and mice generally, or to be so attractive and fatal to such rodents that their eradication will follow or be accomplished overnight or at all."

"Approved May 12, 1944."

Notice

We are glad to print personal items of interest. Send us interesting or newsy items about yourself or your family. This magazine is for the pest control industry, and news about YOU is interesting to the rest of us.

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FERRA relies solely on SCENT to create FEAR. It is a colorless oil, and is guaranteed to be non-poisonous to man or animals. It has no offensive odor whatsoever. And, it is further guaranteed NOT to affect foodstuffs.

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FERRA is NOT a virus. It does NOT innoculate. It merely INFECTS,—and this, by odor alone. Because of this, it is absolutely safe to use anywhere.

Send for a trial size gallon and see the actual proof for yourself. Price of FERRA is $17.50 per gallon, F.O.B. Washington, D. C. $15.00 per gallon in ten gallon lots, and $13.50 per gallon in 50 gallon drums. Terms, cash with order.

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CONTROL OF MILL INSECTS

By R. T. COTTON, A. I. BALZER, J. C. FRANKENFELD

Co-authors of this article, on controlling the insect population of the flour mill, prepared especially for publication here, are R. T. Cotton, A. I. Balzer and J. C. Frankenfeld of the U. S. Department of Agriculture: Agricultural Research Administration, Bureau of Entomology and Plant Quarantine.

THE INSECT population of flour mills has been the subject of study for many years, but, although many plans for control have been devised, few mills are free from insect infestation more than a very brief period during the year.

Observations have shown that flour beetles of the genus **Tribolium** constitute the greater part of the insect population of every flour mill. These insects are extremely adaptable, and breed readily under adverse conditions. Their abundance is governed, however, by the extent to which their moisture, temperature, and food requirements are met. They are able to breed in the moisture-free atmosphere of a desiccator and in flour from which the moisture has been almost entirely removed. They cannot breed however, if the temperature is 65° F. or below. Their rate of reproduction increases with an increase in the moisture content of their food and in the temperature, up to about 80° F., which is the optimum temperature. Above that level reproduction begins to drop and will eventually cease. The moisture content of flour is not so important, but a content ranging from 12% to 14% appears to be most favorable for reproduction.

TABLE 1.—Insect population in 17 flour mills in the Southwest milling area as indicated by the average number of insects in twenty-four 8-oz. samples of stock taken at monthly intervals during 1934 and 1935[1]

Month samples were taken	Samples: Taken	Samples: Infested	Insects per sample (average)
	Number	*Percent*	*Number*
1934:			
April	83	92.8	48.9
May	155	88.4	48.4
June	130	89.2	45.9
July	195	74.7	26.9
August	333	74.2	30.0
September	306	70.3	25.9
October	262	89.3	39.9
November and December	173	79.8	18.8
1935:			
January	224	75.0	28.0
March	300	79.3	26.9
April	206	90.3	26.5

[1]No collections were made during February, and the November and December collections were considered together, because half the mills were sampled each month.

The observations indicated that the average flour mill provided an almost ideal environment for the growth and development of the flour beetle. This inference is supported by the information obtained in a monthly survey made during 1934 and 1935 of the insect population in 17 representative mills. An index of the insect population of each mill was determined as nearly once a month as possible during the period of study by counting the number of insects in an 8-oz. sample of stock taken from each of approximately 24 elevator boots and other locations in the milling streams. The results are summarized in Table 1.

The insect population in the average mill is likely to be high throughout the greater part of the year. It is somewhat smaller in winter, owing to the slower rate of reproduction of the flour beetles during this period, when the mean temperature of their environment is lower and therefore less favorable. It is also usually smaller in July, because many mills are fumigated in June, the efficiency of the treatment being reflected in the insect population during the following weeks.

TABLE 2.—Rate of reinfestation in flour mills after fumigation in June, as indicated by average number of insects in 8-oz. samples taken from the elevator boots during the following weeks

Mill No.	Average No. of insects in 8-oz. samples weeks after fumigation—4	5	8	12	16	20
1	5	....	36	36	46	63
2	....	....	37	76	86	54
3	16	....	55	52	63	....
4	....	103	....	64	....	67
5	....	....	30	28	45	....
6	2	....	25	....	63	....

The rate of development of the insect population in a flour mill after a general fumigation is influenced by the type of mill and the completeness of the kill obtained by the treatment. If the mill is old and of loose construction, and if it contains much woodwork, an efficient fumigation is difficult and insects surviving in the milling units or in cracks and crevices of the woodwork ensure a rapid build-up of the population. Studies made, during the last few years, of the rate of reinfestation in flour mills after a general fumigation lead to the conclusion that insects introduced with the grain stream are not so important a source of reinfestation as the insects that actually survive a fumigation.

In some cases, treatment of the in-coming grain to kill insect infestation had no apparent effect on the rate of reinfestation. Insect populations of two otherwise comparable mills increased at the same rate, although the incoming grain was treated in one mill and not in the other. In summer the insect population of a mill may

TABLE 3.—Insect population in a flour mill October 1942-May 19 43, as indicated by the insects in 8-oz. samples of stock taken periodically from various milling units after a general fumigation.

Milling unit sampled	Number of samples	Average number of insects in sample, weeks after a general fumigation—"A" unit, untreated: 4	7	10	13	18	21	24	27	"B" unit, locally fumigated: 4	7	10	13	18	21	24	27
Break elevator boots	2	0	0	0	0	0	0	2	0	0	0	0	2	0	4	1	1
Purifier elevator boots	4	0	4	0	35	45	27	73	107	2	2	7	7	12	0	30	54
Purifier conveyors	4	4	0	0	1	23	28	25	89	0	2	0	0	3	0	27	7
Tailings elevator boots	1	0	2	14	46	159	8	53	177	0	0	0	9	0	0	3	7
Middlings elevator boots	2	0	0	8	5	12	29	69	79	1	3	4	6	21	15	11	78
Rebolt reel conveyor	1	0	0	0	0	1	10	1	29	0	0	0	0	0	0	0	0
Low-grade reel conveyor	2	0	0	3	27	9	16	12	65	0	0	0	0	4	0	6	0
Low-grade redress reel	1	0	0	0	0	3	8	52	125	0	0	0	0	5	2	3	4
Flour conveyors	6	0	2	8	9	43	64	8	54	0	2	0	0	2	0	0	1
Average	..	1	1	4	13	32	31	31	75	1	1	2	2	6	2	12	19

reach dangerous proportions in as short a period as 5 weeks after a general fumigation, although in mills that do not have a great deal of woodwork to provide harborage in which insects may escape the full effects of the fumigation, the period required to build up a heavy infestation is between 8 and 12 weeks. This is indicated by the rate of reinfestation observed in several mills that were fumigated in June but received no additional treatment during the remainder of the summer. Data on the infestation in these mills are given in Table 2. From 20 to 40 samples were taken at each mill inspection.

Although the conditions indicated by the data in Table 2 are not universal, they do show trends, and when insect populations reach the high levels found 8 weeks after fumigation the task of producing flour free from insect infestation is difficult. A practice that tends to increase the insect population in certain portions of the mill is that of feeding into the mill infested clear and low-grade flours from warehouse storage or from other mills. Such stock is often redressed on a reel conveyer. Insect infestation in the mixing conveyers and packer bins frequently originates from this source. Feed-in stocks should be bolted through a sifter or, if redressed on a reel, should be treated by an efficient centrifugal machine.

The possibility of holding the insect population of a mill to a safe level between general fumigations has been the subject of study in a modern concrete mill in which two 1000-bbl. units afforded the opportunity of

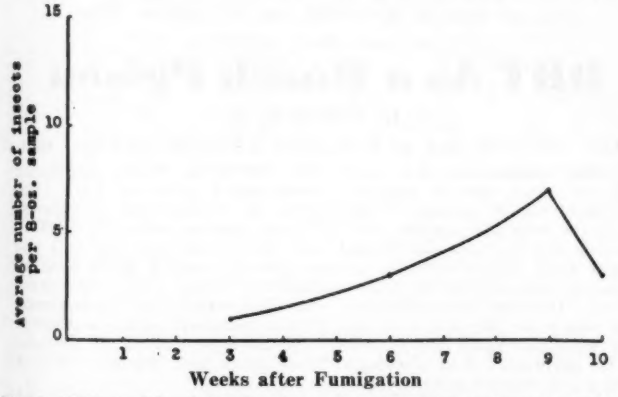

Fig. 1. Effect of local fumigation every 3 weeks on insect population of 2000-bbl. flour mill as indicated by the average number of insects in 8-oz. samples of stock taken periodically from 68 milling streams in A and B mills.

contrasting the effect of different treatments in controlling infestation. The mill in question was fumigated with liquid hydrocyanic acid in October 1942. Four weeks after the general fumigation, one of the 1000-bbl. units, the "B" unit, was locally fumigated with a 3-to-1 mixture of ethylene dichloride and carbon tetrachloride, repeating the fumigation at intervals of 3 weeks throughout the winter and spring. The treatment was simple and included only treatment of the flour conveyors, the dust conveyor, and all reel and purifier conveyors. Elevator boots, which were of metal, rounded and raised above the floor, were not treated but were occasionally cleaned out as routine procedure.

The "A" unit was untreated after the general fumigation, except for the occasional routine clean-out of the elevator boots indicated. As a check on the insect populations of the 2 units throughout the period, 8-oz. samples of stock were taken from 23 milling streams of each unit just before each local fumigation of the "B" unit. The samples were then sifted and a record made of the insects

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present. Table 3 shows the changes in the insect populations of the 2 units during the 27-week period October 1942-May 1943. It may be noted that, although the treatment given the "B" unit was meager, it held the insect population to a very low level during the winter and spring, whereas the population in the untreated unit increased to dangerous numbers during the same period.

The following summer an attempt was made to control the insect population in both the "A" and "B" units of the mill. After a general fumigation with liquid hydrocyanic acid in July, both units were locally fumigated with the ethylene dichloride-carbon tetrachloride mixture every 3 weeks, and in lieu of fumigating the elevator boots, the stock in these boots was removed at the same time. The schedule below shows the milling machinery treated in each 1000-bbl. unit and the dosages used.

In preparation for the treatment the fumigant was put up in 32-oz. graduated glass screw-top bottles, which were distributed about the mill in suitable numbers to treat the various machines. Each reel and purifier conveyor was treated by distributing the 16-oz. dose uniformly along the entire length of the conveyer. Flour conveyers were treated by applying the fumigant as uniformly as possible, along the entire length wherever spouts and hand openings allowed. Spouts leading down from treated conveyers were sometimes closed off by stuffing the opening with pieces of sacking, but this was found to be unnecessary if the conveyers were well filled with stock.

In the bran and shorts dusters it was necessary to stuff the openings at the bottom in order to prevent the vapors from escaping. An experienced fumigator can readily determine whether air currents in individual milling units will necessitate stuffing the spouts below the units to obtain satisfactory results. The work of fumigating was always done on Sundays, when the mill was shut down, the mixture being applied in the afternoon after any needed repair work had been completed. Milling operations were resumed the following morning, so there was no interruption of normal procedure.

TABLE 4.—Effect of local fumigation on insect population of flour mill, July-October 1943, as indicated by the number of insects in 8-oz. samples of stock taken periodically from various milling units throughout the mill.

Milling unit	Number of samples	Average number of insects in 8-oz. samples weeks after general fumigation— A-Mill 3	A-Mill 6	A-Mill 9	A-Mill 10	B-Mill 3	B-Mill 6	B-Mill 9	B-Mill 10
Break elevator boots	3	1	1	0	2	0	0	35	4
Purifier elevator boots	6	11	5	28	10	1	5	15	7
Purifier conveyers	8	0	0	0	0	0	1	1	0
Tailings elevator boots	2	0	1	1	0	0	1	3	1
Middlings elevator boots	3	0	2	5	4	2	24	1	1
Rebolt reel conveyer	1	0	0	1	0	0	0	0	0
Low-grade reel conveyer	2	0	0	0	1	0	0	7	0
Low-grade redress reel	1	0	0	4	0	0	0	0	0
Flour conveyers	6	0	0	7	3	0	0	6	1
Flour elevator boots	2	2	1	0	0	0	0	1	1
Average	..	2	1	7	3	0.4	3	8	2

During the course of the experiment, which extended from the general fumigation in July to another in October, the insect population was determined by taking samples of stock from 34 milling streams of each 1000-bbl. unit every 3 weeks, before each local treatment was given. As shown by the data in Table 4, the insect populations in both units were held at safe levels during this period, which is the most critical time of the year. Both "A" and "B" mills were fumigated locally, and milling stock was removed from the elevator boots every three weeks.

The low insect population in the mill during this period is also shown in graphic form in Fig. 1. Keeping the population low during the summer months ensured the production of insect-free flour, and not a single report of insect infestation in flour shipments from this mill was recorded during the year. The total cost of material for each fumigation of a 1000-bbl. unit was approximately $4.50. The sifters were not treated during the test period, and it is believed that infestations developing in these machines were probably responsible for the large numbers of insects occasionally found in some of the elevator boots. It is therefore recommended that sifters be treated occasionally. Each section should receive a dosage of 16 oz. applied through the spout leading into the top. It has been found that by tying off the sifted socks on the spout below the sifter sections the fumigant is retained well enough to permit an excellent fumigation.

Machinery treated	Fumigant used Oz.
Flour-collecting conveyors:	
Patent, 40 linear feet, 2 oz. per ft.	80
Clear, 40 linear feet, 2 oz. per ft.	80
Low-grade, 40 linear feet, 2 oz. per ft.	80
Dust-collecting conveyor, 54 feet, 2 oz. per ft.	108
Low-grade flour conveyor, 10 feet, 2 oz. per ft.	20
Mixing conveyor, 10 feet, 2 oz. per ft.	20
8 Purifiers, 16 oz. to each of the 2 conveyors	256
9 Reels, 16 oz. to each of the 2 conveyors	288
Bran duster, 32 oz.	32
Shorts duster	32
Total	996 oz. = 62¼ lbs.

The desirability of treating milling machinery about every three weeks may be questioned. Although observations have not been made to determine this point, it is possible that treatment once a month would be sufficient. The ethylene dichloride-carbon tetrachloride mixture was found to be easy and agreeable to use. It is thought, however, that any good local fumigant would give the same excellent results if properly applied.

Reprinted from the April, 1944, issue of American Miller.

DDT As a Roach Poison

A. W. MORRILL, JR.

TEN ADULTS each of **Periplaneta americana** (L.) and **Blattella germanica** (L.) were fed for three weeks beginning July 22, 1943, upon a mixture containing 1 gram of DDT (100 per cent) to 100 grams of dog biscuit or mouse food as follows: (1) DDT and dog biscuit, (2) DDT and mouse food, (3) DDT in acetone (10 cc.) and dog biscuit, (4) DDT in acetone (10 cc.) and mouse food, and (5) DT in acetone (10 cc.) and a 50-50 mixture of mouse food and dog biscuit with glycerin (10 cc.) and amyl acetate (5 cc.). In these tests all the roaches died except one **P. americana** that was given the last mixture. Similar numbers of these roaches held with untreated dog biscuits were alive, and about 35 nymphs of **B. germanica** had developed from eggs laid during the test period and were healthy.

On August 14, 1943, five adults of **Periplaneta americana** and **Blatella germanica** were placed in each of 20 jars containing a vial of water and a few untreated dog biscuits. Into each jar was introduced a wire basket containing a 50-50 mixture of dog biscuit and mouse food ground together to which DDT had been added at rates of 1 gram to 50, 100, 500, 1,000 grams of the food mixture, each rate being replicated five times. After 10 days, 1, 4, 7, and 20 roaches of the first species and 6, 14, 25, and 25 of the second were found alive in the respective mixtures. Twenty-five (all) adults of each species in check jars that were fed upon dog biscuits remained alive.

—*Journal of Economic Entomology, February,* 1944.

Regional Meeting of Rose Exterminator Company

Over the week-end of July 15-16, a Regional Meeting of the eastern offices of the Rose Exterminator Company was held at Parker House, Boston, Massachusetts. Mr. and Mrs. Lester West of the Boston Office were host to the group of representatives that discussed postwar plans and other business pertinent to the interests of the Rose Exterminator Company.

Among those present were: C. Norman Dold of Chicago, Ill., William J. Shrimplin of New York City, York King of Philadelphia, Pa., Joseph Laughlin of Pittsburgh, Pa., Harlem Ives, Detroit, Mich., Robert C. Yeager, Cincinnati, Ohio, Gerald Clem, St. Louis, Mo., Harry S. Lewis, Buffalo, N. Y., and Walter Porter of Baltimore, Maryland.

A little time out was taken for entertainment and we understand that Bartlett W. Eldredge and Charles W. Houghton provided an interesting trip.

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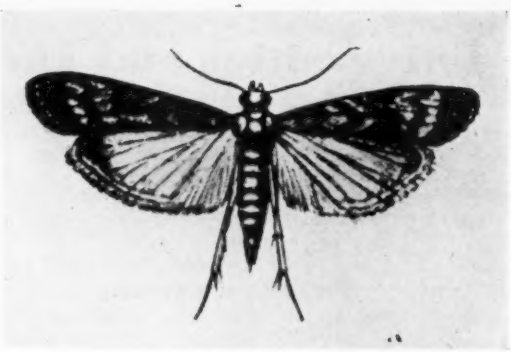

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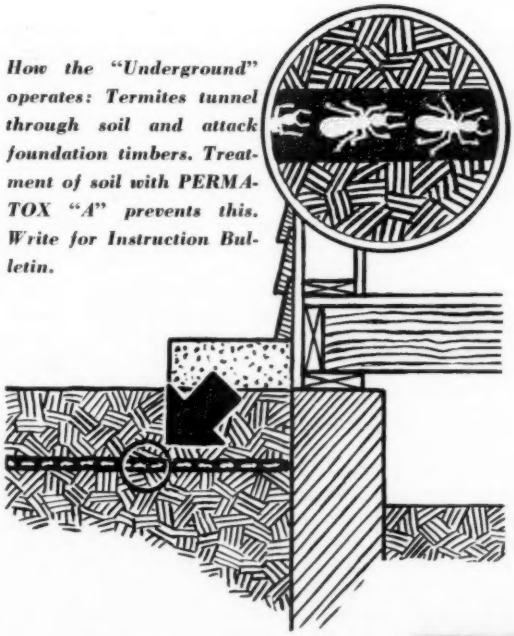

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Universities and The Pest Control Industry

By **M. A. STEWART,** *University of California*

Before the War Emergency Conference of the Pest Control Operators of California, Inc., Los Angeles, Calif., February 2, 1944.

THE FIRST PEST CONTROL Operators' Conference offered under the auspices of a university was held at Purdue in 1937. In 1938 conferences were initiated in California by a meeting at Stanford University and have been maintained subsequently by annual conferences conducted at the University of California. In the southern part of this country, annual conferences have been held at Louisiana State University since 1939. The pest control operators in the northeastern states have been holding conferences at Massachussetts State College since 1941 and, in Canada, annual conferences were initiated at the University of Montreal last year.

The rapid growth of these conferences and the support that has been consistently accorded to them clearly indicates that at least an appreciable segment of the membership of the pest control industry desires to increase its technical knowledge on subjects pertinent to the vocation and appreciates the necessity of such knowledge if the industry is to occupy a secure and ethical position in our modern economic structure. It would be naive to state, despite the encouraging progress of the past seven years, that the overwhelming majority of the operators in the pest control industry clearly appreciate the importance of acquiring more strictly technical and scientfiic knowledge and recognize the fundamental function and value of educational conferences. However, it is certainly true that greater numbers of them will adopt the more progressive and responsible point of view within the next few years because of the inevitable vocational prestige accruing to participants in these conferences and because of the strong and fairly well coordinated sponsorships behind them.

Accepting these statements as facts, it is appropriate at the present stage of development of these conferences to take inventory and attempt to acquire a proper and accurate perspective regarding their present and future roles both as regards the industry and the participating universities and colleges.

The purpose of the present discussion is to consider the relationships to the pest control industry of all universities now offering pest control conferences or likely to do so in the future.

It is highly significant that all of the universities and colleges which have participated in pest control conferences, with but the single exception of one meeting at Stanford University, have been public institutions. Furthermore, it is extremely probable that if regional conferences become more widespread the cooperating universities will continue to be state or municipal institutions because, with but negligible exceptions, only such schools have sufficient numbers of men competent and interested in the economic aspects of entomology, zoology and botany to offer an adequate program and also because it is only in such institutions that public or semi-public service, aside from instruction in regularly enrolled classes, is traditional.

The character of institutions participating in pest control operators' conferences constitutes the crux of the subject under consideration. As public servants, the members of a tax-supported institution have as their chief consideration the welfare of and service to the general public. For obvious reasons they cannot serve either a single business operative or a competitive industry, nor can they devote time which belongs to the public to private enterprises except where such cooperation results directly and unmistakably in public benefit. Stating the situation clearly and frankly, the staff members of a state or city university or college are not at all interested in or concerned with the economic advantage of the individual pest control operator or the pest control industry. They are, however, justifiably interested in the quality of the service rendered by the pest control industry and the cost to the public of this service. Such an interest warrants some effort on the part of these members to assure dependable and ethical pest control operations, thereby indirectly benefiting the pest control operator as well as directly serving the general public. This is the philosophy which underlies the sponsorship of pest control conferences by tax-supported schools.

The unconcern with which is viewed the financial success of the pest control industry does not permit interest in secret chemical materials nor endorsement of private enterprises, but does allow special instruction in scientific and technical fields to members of the industry as a whole, which will make possible more efficient and ethical service to the public because of more accurate information on and a better understanding of both the fundamentals and details of pertinent subject matter relating to pest control.

Thus the relationship of the university to the pest control industry becomes one of presenting to an organized group of pest control operators instruction in the identification and habits of organisms with which he is concerned, appropriate and approved methods of control and prevention, and the elementary chemistry and toxicology of chemical compounds used in the control of pests and prevention of their ravages. Due to the fact that the majority of the problems confronting the pest control operator are of an entomological nature, it is advisable, in establishing a group to handle the instruction given at conferences, to have the "faculty" composed chiefly of entomologists with adjuncts in the way of an economic mammologist, a specialist in fungus infections of timbers, a structural engineer, and a chemist or toxicologist if no insect toxicologist is available.

Perhaps the paramount problem in presenting pest control operators' conferences is to schedule the work in such a way that too frequent repetition is avoided and regular annual attendance is profitable to the individual operator. The university is most certainly not desirous of having regular and repeated attendance at the conferences valuable only because of advertising potentialities; claims of prestige based solely upon mere conference attendance are unethical and such attendance is essentially purposeless unless definite and important information of a technical or scientific character is obtained each time. Since in any given university the man power available for instruction of pest control operators is necessarily limited and consequently the same men must participate

(Continued on Page 33)

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The California Fire Ant and Its Control

By ARNOLD MALLIS, *Los Angeles, California*

ANY INDIVIDUAL concerned with ant control in California all too soon becomes aware of the importance of the California fire ant, **Solenopsis xyloni** var. **maniosa** Wheeler, as an ant pest in the home, garden, and farm. This native ant is exceedingly common in Southern California, as well as in the interior valleys of California up through Sacramento, occurring below altitudes of 1,500 feet.

The entomologist and exterminator are interested in this ant due to its habits of raiding such divers foods as soda crackers, cereals, nut meats, bacon and greases, coffee cakes, watermelon, etc., etc. Moreover, this ant by means of its fiery sting and mandibles is prone to attack human beings, and often injures children as they play upon the ground. At times they will invade the bed, making same a bit too warm for its normal occupants. Several women have reported that these ants attack newly-born babies that have been oiled, but the writer is as yet unable to confirm if this is the species actually concerned. Young chicks and other domestic animals often suffer by the depredations of these ants, and they are often incriminated by the farmer for stealing and damaging seeds, grains, and nut meats.

In the home, they will often remove so much earth from beneath concrete steps as to actually imperil them, and they are at times indirectly the cause of dry rots due to their piling earth on the mudsills beneath the house. Lawns suffer greatly from their unsightly mounds as well as from their tendency to feed upon succulent grass tissue. Not even clothes are immune from these ant rogues, and they will feed upon linen, whether soiled or scrupulously clean, and have been known to bore through an entire box of unused silk hose.

In the garden they faithfully tend aphis on ornamental and crop plants, and will often remove the epidermis from the leaves; moreover, they destroy many plants by making their nests about the base of the plants, evidently feeding upon the roots. The farmer often finds these insect villains in his walnuts, almonds, tomatoes, watermelon, and other fruits and vegetables, through which they readily bore their way. In the citrus orchard they tend aphids and coccids, and in certain instances have been known to remove the bark from young trees in order to feed upon the cambium. Not the least of these injuries is the nervous effect that these ants have upon house-wives, many of whom are made frantic by a siege of these annoying ants. Lighted store windows play the host to huge swarms of these ants, who diabolically enough, often choose those windows advertising ant syrups and ant pastes in order to display their charms. Thus it can be readily understood why these tireless scavangers must frequently be curbed.

The workers of these ants are 1.6 to 5.8 mm. in length, with a yellowish-red head and thorax and a black abdomen, and are to be seen foraging throughout the year. The queens are about 6.6 mm. in length, light reddish brown with a black abdomen, and have been observed from the beginning of March through the middle of November. The males are reddish black with reddish-yellow legs. Swarming occurs most commonly from May through September when the multitudinous queens and males, and the innumerable workers major and workers minor literally boil from the confines of the earth. It is then that wingless queens may be found scurrying over the ground. Each nest apparently issues swarms towards the evening of a warm or hot day, particularly after several cool days have transpired.

In the fields, the nests of these ants may lack craters, being confined to small round openings in the soil or to fissures in the ground, and are often situated beneath old logs, cow chips, and animal carcasses. When craters are present, they are usually to be found in grass lawns and along concrete walks and steps. The nests in the lawn are irregular, shallow, about one-half to one and one-half inches in depth, often several feet in length; and may present a porous appearance as when situated about the base of a plant. Old bones, buried by dogs, will frequently harbor huge numbers of these ants. It is interesting to note the many colorful Staphylinid myrmecophiles emerging from the nest entrances.

Favorite nesting places in the vicinity of the house are at the edge of walks, or in cracks in and about steps. Stones and boards appear to be particularly adapted to serve as nesting sites for these ants. In the majority of cases, the nests are situated in the vicinity of the kitchen, and not infrequently they will nest in the walls whereupon they will be found emerging from crevices in closets and between the tiles of the sink. Should a furnace be situated in the basement, the ants will often have enormous nests directly beneath outlets emerging from the furnice.

The worker minors are very pugnacious and do not hesitate to bite and sting whenever they are disturbed about their nests. When so aroused, they rush forth from the nests in frenzied hordes, raise their blackish abdomens, and vibrate them very rapidly; although the worker major does not hesitate to bite, it rarely stings. The tendency to sting apparently diminishes inversely with the distance from the nest. Some individuals are affected for hours by the irritating sting whereas others may not notice it after thirty seconds. Apparently these ants have the tendency to seek tender portions of the skin, such as, between the fingers, before they assiduously apply both abdomen and mandibles.

During the warmer part of the day, the ants for the most part keep to their nests, foraging most actively in early morning and towards the evening. However, if the nests are in a shaded and moist situation, they will forage throughout the entire day. At night they will be found about lights where they prey upon mayflies, hydrophilids, corixids, and upon other insects that are attracted to light.

The Argentine ant, **Iridomyrmex humilis** Mayr, intolerant of all other ant life, is the deadly enemy of the California fire ant; and the writer has observed the Argentine ants on several occasions to annihilate colonies of the fire ants. It has also been observed that in those localities where **Pheidole hyatti** Emery occurs, it is held in abeyance by the fire ant; and once the fire ant is controlled, this ant may then commence to invade the home in its stead.

Control of these ants is usually rather difficult since arsenical syrups and baits are rarely effective. Syrups

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and baits utilizing thallium sulphate are much more efficient, but due to the insidious nature of this poison, as well as to the lack of an effective antidote, the use of thallium sulphate by private individuals, is prohibited in California. Thus, of necessity, other methods must be utilized in controlling this ant. The writer has used carbon disulfide, and a mixture of carbon disulfide and carbon tetrachloride in the ratio of 1 part carbon disulfide to 3 parts carbon tetrachloride, in the direct control of these ants, with excellent results. Since carbon disulfide by itself is dangerously explosive, the use of the mixture is to be recommended.

Armed with a screw driver, a burlap bag, and an oil can with an eight-inch curve-tipped spout, a survey for ant colonies is conducted about the home. Since it is in the vicinity of the kitchen that most of the troublesome colonies are encountered, it is usually advisable to make the inspection when the kitchen side of the house is shaded, for the ants may not emerge from their nests in full sunlight. The screw driver is used to probe the earth along the foundation, walks, steps, and around plants; it is also utilized to strike the sides of the curbing, wooden stakes, etc. It is thus that the fire ants are disturbed, when they emerge in fiery masses, to their own undoing. For now, a few shallow holes are made in the vicinity of the nest by means of the screw driver, and then a few drops of the liquid fumigant are poured from the oil can into each opening. The holes are then covered by pressing the earth with the handle-end of the screw driver. Cracks in the pavement and steps are favorite nesting sites, and these are also treated with a few drops of the fumigant, and then covered for a few minutes by the wet burlap bag in order to confine the fumes. This treatment when repeated two or three times over a period of two weeks usually gives very satisfactory control.

When the ants are known to emerge from ventilators within the house, or even from cracks in the floor situated in the center of the house, it may then be concluded that the ants are probably nesting beneath the house. Excellent control for at least one season may be obtained by dusting the under portion of the house with lime, slaked or unslaked lime being equally effective. Approximately three-fourths of a bag of lime, an amount sufficient for the average six room home, is forced through the ventilators beneath the house by a bellow-type duster. The dust should be evenly distributed throughout, with particular attention paid to the area beneath the kitchen. After a day or two, a few struggling colonies may emerge at the edges of the foundation, and these may be treated with the liquid fumigant in the previously described manner. It may be mentioned that black widow spiders, and other spiders as well, appeared to be sorely distressed by the lime dusting treatment.

When the ants occur in closets, they can be curbed by confining the fumes of a saucerful of ethylene dichloride-carbon tetrachloride mixture to the closets for a few days. This mixture is composed of 3 parts, by volume, of ethylene dichloride and 1 part, by volume, of carbon tetrachloride.

Experiments with carbon disulfide emulsion, as well as with corrosive sublimate solution have been conducted, but much work must yet be done to prove their efficiency.

N.B.—The use of thallium sulphate preparations by properly authorized individuals is now permitted in California.

THIS IS MY JOB

By **J. SHEARD**

I'M AN AGRICULTURIST and about five years ago I applied for a post as a sleeping sickness control officer in Nigeria, the largest of our West African colonies. Sleeping sickness is widespread over most parts of Africa. It's not the same as sleepy sickness which is a type of inflammation of the brain. Sleeping sickness is a parasite which gets in the blood, and eventually you can't work—it saps all your energies.

My job in Nigeria was nothing to do with the medical side of sleeping sickness: it was to help in controlling the tsetse fly which carries the disease. And the sort of work I had to do was to organize the cutting down of the vegetation alongside streams and rivers, because it's in the growth on river banks that the fly lives and breeds.

When I got to Nigeria I was sent right into the interior, to a place called Anchau. I did the first six or seven hundred miles by train from the coast, and the last sixteen partly on foot and partly on a borrowed bicycle—for Anchau isn't exactly a metropolis. In fact it consisted then of a mud office with a thatched roof, and four mud houses, near an African village of about 2,000 people. Round the village stretched a mile or two of cultivation, and then bush. And one of my first jobs was to catch tsetse flies in this bush. They're brown in color, about twice as big as a housefly, with a sharp bite. And if they happen to be infected when they bite you, they inject into your bloodstream the germ which causes the disease.

Now catching flies may seem rather an absurd job for a grown man, and rather hopeless, too. Africa's a gigantic continent, and parts of it teem with these flies. But there's much more to this game than just running after flies with a butterfly net. We only do that for special purposes, for instance to estimate how thick the flies are in a certain district.

There are really two lines of attack in fighting sleeping sickness in Nigeria. One is to drive out the tsetse fly itself. The other is a direct attack on the disease by treating the people who have contracted it. These unfortunately number many thousands in Nigeria, because sleeping sickness spreads rapidly, especially in the North, after British rule opened up the country and people began to travel about a lot. There's no certain way of preventing infection, but the disease **can** be cured, always provided it's taken early enough. If it isn't, if the parasite has got into the spinal cord or the brain, then it's fatal.

To tackle its prevention, the Sleeping Sickness Service in Nigeria in peacetime formed several teams to go round the country. In each team there were eight or ten trained Africans, under a European doctor or an N.C.O. (non-commissioned officer) of the Army Medical Corps. The country was divided into blocks, then a team went into each block, in turn, with the aim of examining every man, woman and child, in that area; examining him and, if he had sleeping sickness, giving him treatment.

In the first three years of the war, we examined nearly a million people. That sounds a tall order, but it was quite extraordinary how people turned out for the parades, urged on of course by the village headmen and chiefs. I've seen old men hobbling in on sticks and babies in arms. They formed long lines in front of the camp,

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and filed past, and the African assistant punctured the neck glands of everyone who looked at all doubtful, took a little of the fluid, and examined it under the microscope. Whenever the germs were found, the person was told to come back for treatment.

To begin with, the people were shy and rather frightened, but after a bit their confidence grew, and now we reckon on getting 90-97 per cent of the total population of each area to come in for examination. In this way we've been able to reduce the incidence of sleeping sickness to a remarkable degree. In some areas, as many as thirty people out of every hundred were infected. Now, wherever our teams have been, infection is down to perhaps one or two people out of every hundred.

After the teams have conducted their blitz, as it were, on the sleeping sickness area, we send in a holding force to keep down infection. We do this by setting up dispensaries or clinics in the bush village. Quite simple structures, just a mud hut with thatched roof, right out in the bush, and we put in charge an African, who's trained not only in sleeping sickness control, but in elementary doctoring generally, and in sanitary work. He soon becomes a centre for health work in the whole district. People flock to him for simple treatment of everything from tropical ulcers on the legs to burns, tummy-ache and broken bones. In fact, these dispensaries are now doing far more general medical work than just sleeping sickness control, and we're raising the standard of education of our African assistants as fast as possible to keep pace with the demands on their skill.

It was the second line of attack, on the fly itself—that I was working on. The whole thing was based on a careful study of the fly's habits, on where it bred and how it fed and lived. You might compare this with intelligence work in the Army. Any campaign must be based on intelligence reports about the enemy's forces and dispositions, and try to find out his weak points.

We knew that our particular kind of tsetse breeds on the river banks, where there's plenty of shade and water. And we found out that they can't live if it gets too hot—if the temperature goes higher than 102 or 103 degrees.

That was the enemy's weak point. So if we cleared away all the trees and bush along the river banks, removing the cooling shade, then it became too hot for the tsetse, and he moved off elsewhere.

That may sound easy, but in practice it didn't turn out to be easy at all. Cut trees grow again quickly, and there were objections that we would cause erosion if we cut down too many. And then the unskilled African laborers had a habit—if you didn't watch them carefully—of letting the trees fall on each other. Moreover we needed a great deal of money. But all difficulties were overcome, and the British Government put up about $250,000 under the Colonial Development and Welfare Vote, to finance a tree-clearing and settlement scheme at Anchau.

We discovered that grass prevented erosion on the river banks just as well as bush and trees. We trained men to work methodically and in teams to avoid accidents, and to keep down growth we arranged for re-cuttings to be done every year.

We then did population, land and vegetation surveys, so that certain blocks of country could be kept under permanent cultivation, and at the same time leave enough room for expansion.

People in badly infected areas, that couldn't be cleared of the fly, were then moved to these cleared areas. The Government built model villages for them—we've built 24 so far—and the old villages were partially rebuilt and cleaned up. Slum clearance in Africa, if you like. Well, over 3,000 people have been moved and are still being moved. Many more have been rehoused. Altogether 20,000 people have been affected by the clearing, better water supply and hygiene. We sink new cement-lined wells in all villages, old and new, and the incidence of guinea worm alone has gone down to almost nothing. If you could see the frightful mess these worms make of many people's legs and arms, and the suffering that they cause, you'd understand what a great thing a clean water supply is.

Another thing we do is to plant fruit trees of all kinds, especially oranges. We've introduced new crops such as soya beans, and improved existing crops like ground nuts. We've followed up closely with supervision and propaganda, and it's been demonstrated how much better off the people are with all these improvements, always provided they're followed up, and the people are not left to slide back into the bad old ways.

The thing I like best about my job is its great variety. One week I may be making a road or track to get to an area—for a lot of this sleeping sickness country is right at the back of beyond. Another week I've switched over to stream clearing, then to getting a village rebuilt, then to sinking wells, and then to giving general advice and supervision on methods of farming.

It seems a far cry from sleeping sickness to farming. But actually the two things are very much part of the same picture. To keep down tsetse fly and establish these new settlements, we've got to improve native farming. The African, you see, is a very primitive cultivator. Normally he exhausts his land in a few seasons, for he uses no manure beyond household refuse. Then when he's worn out the soil he moves on to a new locality, and the bush grows up again and back comes the tsetse. So, in order to really tackle the fly, we've got to try and change this habit of shifting cultivation, as it's called. That's a big job—and a slow one. One thing we must do is to introduce livestock and persuade the people to adopt the system of mixed farming. At present only nomadic tribes like the Fulani keep cattle—the ordinary peasant farmer doesn't. We've got to try to break down this division between the two great branches of agriculture.

We are now starting communal herds of cattle in the villages, introducing pigs, and improving breeds of goats and poultry, in short, doing everything we can to make the people "stock-minded." In this way, we hope to increase the manure available for the soil and to stabilize agriculture, and at the same time to give the Africans more meat and milk. Like Lord Woolton, we try to improve the balance of the population's diet, which is usually deficient in vitamins and proteins. This is a cause of much of the malnutrition and disease in Africa.

So you see, from a purely sleeping sickness scheme we are growing into something of a Rural Health and Development Department, touching the very heart of the country. Previous development has been confined to the large towns with their hospitals, schools generally speaking, and in actual fact affected comparatively few of the vast peasant population. So I think that we, with our sleeping sickness work, are giving the peasant, who pays the bulk of the Nigerian tax, something for his money.

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On June 19, CHARLIE HOUGHTON, of The Safety Fumigant Co., Boston, and Mrs. Houghton, greeted their new-born, christened David Gates. He weighs 8 lbs. 12 ozs. Our heartiest to the Houghtons.

CHARLES D. CUSHING, formerly of the Vogel-Ritt Co. of Ohio, Cincinnati, writes the Secretary's office he is now a Soundman Third Class in the Navy, a vocation, he regretfully advises, not even remotely connected with pest control. From C. H. Bowen, one-time entomologist associated with the Chec Co., St. Louis, also comes word that he has joined the Navy. Currently stationed at the National Naval Medical Center, Naval Medical School, Bethesda 14, Md., Lt. (j.g.) Bowen is taking a course in Malarial Control and other Medical Entomology.

DR. THOMAS LEWIS and HAROLD MEYER have been elected Vice Presidents of S. B. Penick & Company, it was announced recently by S. B. Penick, Jr., President.

Previous to joining S. B. Penick & Company in 1930 as Technical Director, Dr. Thomas Lewis was head of the School of Pharmacy at Cardiff, Wales.

During his fourteen years association with S. B. Penick & Company he has represented the firm on the Scientific Committees of the various associations of the industry, including assistance to the Revision Committees of the United States Pharmacopoeia and National Formulary.

Mr. Harold Meyer entered the service of S. B. Penick & Company in 1926 and until 1934 held several progressive positions in the Sales Division of the Company.

In 1934 Mr. Meyer was commissioned to establish a midwestern branch of the company in Chicago, Illinois, which he has successfully managed and developed in the meantime.

JAMES G. FLANAGAN, Secretary and General Counsel, was elected a member of the Board of Directors, it was also announced.

CONOVER JOINS SONNEBORN—J. N. Conover has joined the White Oil Division of L. Sonneborn Sons, Inc., New York, as assistant to R. W. Bjork, sales manager of the division. Before joining Sonneborn, Mr. Conover had been engaged in special sales work with Gallowhur Chemical Corp., and prior to that was associated for 19 years with Stanco Distributors, Inc.

Well known in drug and chemical industry circles, he will make New York his headquarters and will assist in sales and promotion of Sonneborn petroleum products.

PENICK BUYS DUVAL; EXPANDS FACILITIES OF ESSENTIAL OILS AND AROMATIC CHEMICALS DIVISION—The purchase of Compagnie Duval, 121-123 East 24th St., New York, by S. B. Penick & Company, 50 Church St., New York, is announced today. According to officials of the latter company, the Duval personnel will continue to serve its many foreign and domestic customers, and will become a unit of the Penick Essential Oils and Aromatic Chemicals Division.

S. B. Penick & Company is well known in the production of botanical drugs and fine chemicals, serving an extensive export trade, in addition to the domestic market. It is said that the acquisition of Duval will bring new advantages to customers.

THE NATIONAL SHADE TREE CONFERENCE will hold its 20th Annual Meeting at Hotel William Penn, Pittsburgh, Pa., August 30 and September 1, 1944. New insecticides, fungicides, current insect and disease problems, among others, will be discussed.

UNION AGREEMENT HIGHLIGHTS—In identical letters to the New York Pest Control Association and the Exterminators and Fumigators Union No. 155, N. Y., under the date of July 5, C. A. Pearce, Wage Stabilization Director, National War Labor Board, ruled:

" . . . You may increase the scale for licensed exterminators and fumigators to $35.65 per week; the scale for apprentices may be increased by $1.65 at each of the established progression steps, and the per diem rate for extra men at $7.50 per day. These increases may be made in order to correct maladjustments under the "Little Steel" formula.

"Your proposal to grant one additional holiday [Columbus Day] with pay is hereby denied. Your request to grant two weeks' vacation at straight time pay after five years of service is hereby approved.

"This ruling . . . may be made effective as of January 1st, 1944."

Of noteworthy interest is the fact also that the NWLB did not grant all that the union requested.

THE BUSINESS heretofore conducted under the name of James Good Co., of Philadelphia, Pa., by Mabel Meehan Schlimme and Philip C. Herr, will be continued and operated hereafter by Robert England, under the same name, viz: James Good Co.

There will be no change whatsoever in management or personnel.

"INSECTICIDE AND FUNGICIDE OUTLOOK", for '44, is discussed by Harold H. Shepard, Office of Materials and Facilities, W.F.A., in May 1944 "The Agricultural Situation", a publication of the U.S.D.A.

THE FATHER OF D. P. McALINDIN, operator of the Royal Exterminating Co., Hoboken, N. J., passed away recently. We extend our condolences and sympathy to the bereaved family.

A letter from Charles Cushing, formerly with Vogel-Ritt, Inc. writes as follows:

"I would be glad to get any back issues from January, 1944. Start my subscription then. Mail them at my present address and I hope my stay here is temporary, however, until Tojo and Schickelgruber turn up their toes, it will be a good place to find me."

Charles' address is:
C. D. Cushing, SOM 3/C-USGC (R)
7017-980 CG Cutter "Tupelo"
c/o Fleet Postmaster
San Francisco, Calif.

WHEN P. CALVERT CISSEL, former NPCA president and owner-operator of the American Disinfectant Co., Washington, D. C., returned home late one night recently from a local association meeting, he found a note on his bureau from his son, Lee, aged 11, that said: "Dear Daddy—If your company takes care of 4820 Bradley Blvd. there are rochies in there, that is on my paper route." Loyalty to the family interest—and the industry's too—is just a good old Cissel custom, which Lee's note highlights. More power to him.

ADD AGE OF ANIMALS—When a heavy storm in Lancaster, Mass., flooded a pasture, field mice saved themselves from drowning by climbing on the backs of cows.

IN THE GUN BATTLE off the Normandy coast, a Scotsman told the gunner: "Now, laddie, don't hit any of them French girls" . . . 3-inch shells hit the ship. One shell fell, unexploded, on the deck five feet from the magazine. A Royal threw it overboard . . . "Wheelhouse Jake," the coxswain, roared his demands for tea and was served on deck . . . A Nazi bomber crashed into the sea, 30 yards away. It was too late to swerve or reverse the ship and the LCG sliced through the plane, while German petrol sprayed the guncrew. But there was no explosion . . . When one shell ripped through a locker and took with it a pair of trousers, the pants-less Marine shouted: "Hey, have mice been in here?"

—The Lyons Den, N. Y. Post.

FIGHT BEES, START $200,000 FIRE—Longview, Wash., July 8—A two-man quest for a wild bee honey cache between the walls was blamed today for the $200,000 fire which destroyed the Pacific Paperboard Company box plant this week. E. L. Smith, assistant State fire marshal, said the two men, whose names were not given, admitted using a blow torch on the hive after the bees stung them. The quest netted one quart of honey.

—N. Y. Times.

U. S. WILL BUY PYRETHRUM FROM BRAZIL—An agreement between the Brazilian and the U. S. Governments was recently signed by which the United States will buy all pyrethrum flowers grown in Brazil, in excess of local needs, for the manufacture of insecticides. The present crop was estimated at about 1,000 metric tons, and increased production is expected in the future.

PAST PRESIDENT BARTLETT W. ELDREDGE BECOMES GRANDFATHER—Heartiest congratulations to the Grandparents, Mr. and Mrs. B. W. Eldredge of Waltham, Mass., who have been advised by their daughter, Barbara (Mrs. Robert Watt) that there arrived on Friday evening, July 21st a daughter, Judith, who, it is said, has all the earmarks of carrying the same beauty as do all the Eldredge's. Bart always did want a secretary from within the family and it can be taken for granted that Judith will be broken in as soon as possible.

HITLER BOMB CANCELS TALK ON KILLING RATS—London, July 20.—Immediately after announcing today the assassination attempt against Adolf Hitler, the German home radio substituted music for its next scheduled program.

The canceled program was a lecture entitled "Extermination of Rats."

HEAT FUMIGATION—A new method of attacking insects in corn by means of heat is being investigated by the Institute of Inter-American Affairs at Iowa State College. Lacking fumigants, a brick storage building holding 160 bushels of shelled corn is being constructed, with provision for heating it to 120° F. to kill insects.

DDT NOT EFFECTIVE FOR ALL PURPOSES, NEEDS FURTHER TESTING—DDT, much publicized as a louse powder and fly spray, is not a universal insecticide, effective for all agricultural purposes, the USDA warns farmers in this statement. "We receive many requests for supplies of DDT, and for information about it, particularly from insecticide dealers, farmers, and Victory gardeners," Dr. P. N. Annand, Chief

of the Bureau of Entomology and Plant Quarantine, said. "DDT is not now available for civilian use. While it appears to be very promising for future control of many insect pests, many of the experiments to test its effects on insects, plants, and higher animals are still in preliminary stages. Later tests may change the entire picture materially. Our entomologists have not had large enough supplies available to make large-scale tests. Consequently, we are not in a position at this time to recommend general use of DDT as an insecticide for agricultural purposes." Results of tests to determine true value of DDT for the control of certain insects will be made known from time to time and will be the basis for whatever recommendations are made by the entomologists.

DDT. Because of greatly increased military requirements, the Chemicals Bureau is studying proposals for increased large-scale production submitted by present and prospective producers. Government officials reported to the industry advisory committee on experimental studies begun 2 years ago in cooperation with the Office of Scientific Research and Development, augmented by programs sponsored by Harvard University, University of Maryland, and Ohio State University. Production problems are being worked out at Pennsylvania State College and Rhode Island State College (WPB-5835).

AD WITH A STING—A staff member of this newspaper, an inveterate reader of classified advertisements, has come across one which appeared in last Sunday's issue of "The Milwaukee Journal" and which seems to contain a hint of nervousness. It reads: "Not responsible for bees left at 6858 Appleton Avenue; identify personally at 7701 West Clark Street within three days or they will be disposed of for storage."

Business Opportunities
(Classified)

RATES — For individuals seeking employment, 5c per word, minimum $1.00. All others 10c per word, minimum, $2.00. All advertisements must be in the hands of the publishers seven days before publication date and must be accompanied by cash or money order for payment in full. The publishers are not responsible for any false or misleading advertisements.

Replies to advertisements where box number only is indicated should be addressed c/o PESTS, 512 E. 14th St., Kansas City 6, Mo., giving box number as well.

Profitable exterminating company in Ohio will sell outright or 50% to a good operator. Cash or payments.
WRITE BOX 20—PESTS.

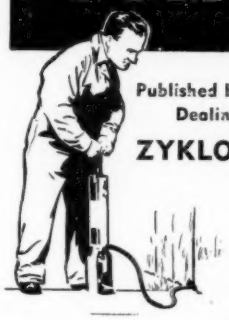
Will pay cash for 51% to 100% of large or small exterminating company in Illinois, Indiana, Ohio, Michigan, Washington, D. C.
WRITE BOX 15—PESTS.

Well established, profitable, Pest Control Service, with enviable reputation, for sale. Located in Lower Rio Grande Valley of Texas. Box 984. Pests.

Termite Control Service and Sales Manager wanted by old reliable concern. Unusual opportunity for man who can qualify. Write full particulars, experience and salary desired.
WRITE BOX 25—PESTS.

WANTED—Three experienced Pest Control Operators to connect with a reputable firm. Midwest territory. State salary, experience, qualifications.
WRITE BOX 70, c/o PESTS.

FUMIGATION NEWS



Published For The Information Of The Pest Control Industry
Dealing With Fumigation Involving The Use Of

ZYKLON DISCOIDS AND CYANOGAS

AMERICAN CYANAMID & CHEMICAL CORPORATION
Insecticide Department
32-E Rockefeller Plaza, New York 20, N. Y.
Branch Offices—625 Dwight Bldg., Kansas City 6, Mo.
2203 Ferry St. South, Seattle 4, Wash.—Azusa, Cal.

EFFECT OF HCN ON FOODSTUFFS

A very natural question often comes up as to the effect of ZYKLON DISCOIDS (the HCN fumigant) on foodstuffs. The best answer to such a query is that through exhaustive research, it has been found that hydrocyanic acid may be used to fumigate the widest variety of food products without impairing their color, texture or flavor in any way.

Hydrocyanic acid does not combine chemically with foodstuffs and is not fixed permanently in the products under treatment. Certain precautions should be observed, however, when fumigating commodities carrying a high moisture or oil content. For example, in the fumigation of domestic dwellings, it is necessary to remove all milk, butter and liquid foods, such as jams and preserves, unless contained in sealed containers. When commodities carrying a high moisture or oil content are fumigated directly as in a fumigation chamber, the desorption of HCN is slowed down, and the aeration period should be extended before releasing them for public consumption. Fresh fruits and vegetables should never be fumigated with the dosages of HCN used for dry food commodities.

TEST FOR THE PRESENCE OF HCN

More and more Pest Control Operators are now using methyl orange test papers as standard procedure. These are small strips of paper which immediately turn pink or red in the presence of hydrocyanic acid. They are placed between mattresses, pillows and bedding to indicate the presence or absence of HCN.

Methyl Orange Test Papers are available from this company in convenient bottles, bearing a combination label and color chart at 50c per bottle containing approximately 75 papers.

PRE-COOLING ZYKLON DISCOIDS

During the hot weather the Pest Control Operator should keep in mind that when he has a fairly large quantity of ZYKLON DISCOIDS to be used at one time, say 50 lbs. or more, they should be pre-cooled several hours before fumigation. This is readily accomplished by the use of dry ice. The procedure is to remove the tops of the shipping cases and also to remove the fibre cap from the Discoid cans, both the top and bottom layers. Then, before replacing the upper layer of cans, cover the lower layer with dry ice. Finally, cover the entire case with a heavy canvas or tarpaulin in order to "keep the cold in."

CITY DUMPS EASILY CLEANED OF RATS WITH CYANOGAS

An outstanding example of large-scale rodent eradication recently occurred at a Jersey City dump. A few highlights would be of interest.

A rat-infested Jersey City dump was entirely cleared of rodents with CYANOGAS.

Typical of all rat infestations, the city dump was the source and foci of infestation, as well as a rat paradise. This area had been used as a dumping ground for many years—a perfect harborage from which rats could carry on their depredations and spread their infectious diseases.

For a control material in combatting this infestation CYANOGAS A-DUST was selected. An area was sectioned off and CYANOGAS was dusted into the burrows by using a CYANOGAS Foot Pump. Pressure equipment makes it possible for the gas to be diffused deeply and effectively into the tortuous, winding burrows. Those escaping from other exits of the burrow system in many cases dropped dead in their tracks a few feet from the burrows since they had breathed a quantity of HCN.

The following morning very few new burrows were found, and those which did appear were again treated with CYANOGAS. When the dump had been completely treated the area was filled in and bulldozed, and today this area is thoroughly sanitary, clean and entirely cleared of rodents.

For positive and economical rat control there is no equal to CYANOGAS. In sectioning off any particular dump area approximately 40 to 50 burrows can be treated with maximum results with only one pound of CYANOGAS. Its record of performance —millions of dead rats—bears vivid testimoney to its effectiveness.

WRITE FOR THESE BOOKLETS

The latest helpful information service literature will be sent to you without cost or obligation. If, in addition, there are any particular pieces of literature offered by advertisers in this issue you are interested in receiving, either write them direct, or if you prefer, please send us such requests.

Please note, however, that you must request each booklet on a separate letterhead though they may all be mailed in one envelope addressed to Pests, 126 Lexington Avenue, New York City, N. Y.

SPECIAL ROACH POWDER

Circular describes a roach powder (containing Lethane A 70) which, it is stated, is fast acting, positive in kill and will not deteriorate for at least eight weeks after application. As a result, the supplier points out, the PCO does not have to service his customers as often, thereby conserving manpower. Moreover, it is stated, the powder is non-toxic to warm-blooded animals and may, therefore, be used in dairies, packing and food handling plants, homes, etc., in fact, in all places where sodium fluoride mixtures may not be used. . . . Described also is a sodium fluoride-Pyrane formulation for the PCO who wishes to make his own roach powder.

WRITE PESTS—Bosley.

SYNTHETIC ROACH POWDERS

Research material apropos thiocyanates in powdered form for roach control in place of pyrethrum — describes the development and properties of roach, ant and bedbug powder based on Lethane A-70.

WRITE PESTS—SYNTHETIC.

MILITARY FUMIGATION MANUAL

This special 48 page manual has been prepared for the benefit of officers and civilians in the Armed Forces who are responsible for vermin control, and for PCOs who may contract with the Armed Forces for fumigating work. Among other subjects, the manual discusses: dosage, preparation of building for fumigation, fumigation operation, common pests, cockroach control; precautions, first aid methods, etc.

WRITE PESTS—AC.

TERMITE CONTROL

Folder discusses concentrates available for two distinct methods of termite control: (1) treatment of timbers in place with an oil solution, and (2) treatment of all soil around an infested building or area with either an oil or water soluble chemical. Issuing company states it specializes in all problems concerning wood-destroying organisms and also wood preservation and invites your inquiries thereto.

WRITE PESTS—WOOD.

FUMIGATION SAFETY SUGGESTIONS

Of timely interest, in view of the at-hand fumigation season, is this bulletin which advocates as a safety measure the use of methyl orange-mercuric chloride test papers for the presence of HCN. It also discusses can openers for Zyklon Discoids, the need for adequate ventilation after fumigations, and gives a cautionary note on pilot lights in premises to be fumigated.

WRITE PESTS—AMERICAN.

STERILIZING GAS MASKS

News bulletin describes a chemical that is claimed by the manufacturer to be effective in sterilization of gas masks. Bulletin also discusses antidotes and first aid, particularly an inhalant which functions best as an antidote to HCN poisoning, and where obtainable.

WRITE PESTS—A-C-73

RAT GLUE AND BOARDS CIRCULAR

discusses use of rat glue boards as a means for effective rat control, etc.

WRITE PESTS—ELKAY.

FUMIGATION AND PLASTICS

News release discusses use-co-ordination of such diverse chemical products as plastics and fumigants in connection with infested bagged grain, seed, packaged or boxed foodstuffs. Methyl bromide-plastic-tarpaulin method of disinfestation described.

WRITE PESTS—DOW

The Texas Gulf Sulphur Co. has recently published a revised copy of The Use of SULPHUR in the CONTROL of TRUCK CROP and CANE FRUIT INSECTS and DISEASES. Any desiring a copy of this booklet which is for free distribution, can obtain it by writing to The Texas GULF SULPHUR Co., Second National Bank Bldg., Houston 2, Texas.

PYRETHRUM - DERRIS - RED SQUILL PRODUCTS

Leaflet describes foregoing insecticides with special bait chart for use in connection with powdered red squill.

WRITE PESTS—PRENTISS.

SOLVAY PRODUCTS

48-page booklet in colors and illustrated, covering their entire line of Alkalies and Special Products, with a special section dealing with Para-Dichlorobenzene and Ortho-Dichlorobenzene.

FREE COPY MAY BE HAD BY PEST CONTROL OPERATORS. WRITE SOLVAY, c/o PESTS.

DEODORANT

Catalog includes price data, etc., on deodorant which it is felt can neutralize and deodorize such toxic agents as Thanite, Lethane 384 Special, Velsicol, etc. Also contains data on perfume oils for sprays made with pyrethrum and kerosene.

WRITE PESTS—MAGNUS.

ELECTRIC FANS

Bulletin discusses value of electric fans in connection with fumigation work, also some pertinent thoughts on the Schafer Prone Pressure Method of Resuscitation, etc.

WRITE PESTS—AC-69.

MOLE KILLER PELLETS

Circular describes mole killer pellets which manufacturer states requires no traps, no gas, no exposed poison. Diagram of runways and explains how mole lives. Testimonial letters.

WRITE PESTS—CARAJON.

PRESERVATION OF MILLWORK AND OTHER DRY WOOD PRODUCTS

Bulletin discusses composition of Permatox B Concentrate and its application in the preservation of millwork and other dry wood products.

WRITE PESTS—Permatox 43-B.

NEW CHEMICAL PROCESS OFFERED FOR RAT-PROOFING

Circular discusses a liquid oil spray that is made from the serum of a skunk, which, it declares, is a revolutionary method for repelling rats and mice from buildings, warehouses, etc. Its odor, in raw liquid state resembles that of a ferret, according to the circular. The spray, it further states, has, to a rat or mouse, the same odor as a ferret. Applied with any kind of a hand sprayer, the spray is colorless, guaranteed to be non-poisonous to man or animals, has no offensive odor whatsoever and is guaranteed not to affect foodstuffs. One ounce, when sprayed according to directions, will treat an average sized room and as soon as it is sprayed on wood, plaster or other porous materials, it sinks in and lasts for a full six months. If used on brick, stone, tin or other non-porous materials, states the circular, the coating will last for at least thirty to forty days before wearing off.

WRITE PESTS—Belmont.

CONTROL OF TERMITES-POWDER-POST (LYCTUS) BEETLES-DECAY

Circular discusses properties and uses of Permatox A in termite control and its application to soil and wood to control termites, decay control, powder-post beetle prevention and control. Description of Permatox T and its uses in termite control, as a soil poison, are also discussed, together with toxicity.

WRITE PESTS—BULLETIN 43-T.

BOX CAR FUMIGATION

Folder describes box car fumigation with methyl bromide, giving details as to: car seal, applicator arrangement, methyl bromide application, dosage, exposure period, temperature, aeration, precautions.

WRITE PESTS—DOW

Hydrocyanic Acid Poisoning—Skin Absorption

Bulletin discusses some pertinent safety suggestions with respect to avoidance of hydrocyanic acid poisoning through skin absorption.

WRITE PESTS A-C-74

BIRD REPELLENT

Circular describes product which manufacturer claims will serve as an effective repellent against pigeons, starlings, bats, dogs, cats, rats, mice, woodchucks, moles as well as crawling and flying insects that prey upon plantings and seedlings.

WRITE PESTS—PX

THE ACTIVATING EFFORT OF PYRETHRUM UPON THE GERMAN COCKROACH

Research material prepared by John M. Hutzel, of the Ohio State University, Columbus, Ohio in cooperation with the Kenya Pyrethrum Extension Service, Inc., N. Y. Supervised by Professor F. L. Campbell.

WRITE PESTS—PYRETHRUM.

NEW ANT TRAP

Manufacturer claims many new features such as no turning or twisting necessary; four openings; larger trap; contents ⅓ greater than any other competitive brand.

WRITE FOR YOUR FREE SAMPLE OF ANT TRAP TO NOTT, c/o PESTS.

PRESERVATION OF LUMBER, POLES, POSTS, PLYWOOD WITH PENTA-CHLORPHENOL

This bulletin gives a brief summary of the properties, use to date, and recommendations for the preservative treatment of lumber, poles, posts, and other forest products with Permatox A. This product, it is stated, has shown outstanding promise as an effec-

One of the *few* ANT CONTROLS
that still contains
THALLIUM SULPHATE

TAT
TRADE MARK

ANT TRAPS . . .
for destroying house ants

ANT BAIT . . . . .
for destroying garden ants

Thallium Sulphate, the only *tasteless* and *odorless* poison known, is the world's finest medium of ant control. Don't risk using substitutes that do *not* work.

Exterminators who want to use their own brand names can buy ANT TRAPS *UNLABELLED*. *Act fast*—because America's supply of Thallium Sulphate is limited!

SOILICIDE LABORATORIES
51 JAMES STREET MONTCLAIR, N. J.

"TOX-EOL" 12½ TO 1 SUPER CONCENTRATE

NOW AVAILABLE WITHOUT PRIORITIES

FOR TERMITE CONTROL

Chlorinated Phenol Toxic Base, which has been effectively used for many years by the larger Termite Control Operators from Coast to Coast in the "TOX-EOL SYSTEM" of Termite Control.

This new super strong CONCENTRATE may be diluted with 12½ parts Fuel Oil, Kerosene, or even Crank Case drainings to make the proper strength (over 5%) treating solution.

"TOX-EOL" 12½ CONCENTRATE means lower transportation charges, fewer containers—lower chemical cost. Now costs less than creosote.

FOR WOOD OR SOIL TREATMENT

Write for our plan of dealer co-operation and 5 year Warranty.

CRE-O-TOX CHEMICAL PRODUCTS COMPANY

Pioneers in the use of Chlorinated Phenols for termite control.

MADISON AT WILLETT MEMPHIS 4, TENNESSEE

WHETHER YOU NEED INSURANCE OR HAVE AN INSURANCE PROBLEM

Why not do as America's leading PCOs are doing: consult with B. & D. A. Weisburger, an organization (in business since 1915):

1. That has specialized in PCO insurance needs . . .
2. That has written a far greater volume of this type coverage than any other organization in the U. S. . . .
3. That has through its close cooperation with the National and local pest control associations brought about substantial underwriting benefits for the Industry . . .
4. That issues policies in all representative AMERICAN STOCK COMPANIES, IN ALL STATES, providing coverage for

Public Liability — Workmen's Compensation
Auto Liability — Products Liability
Property Damage — All Allied Lines

Also Life Insurance and All Forms of Employee Insurance Plans

Write Today for FREE Check-Up of Your Insurance Needs.

NATIONAL PEST CONTROL ASSOCIATION

B. & D. A. WEISBURGER
Insurance Consultants for America's Leading PCOs
1440 BROADWAY NEW YORK CITY

ACME — The Gas Mask That Helps Speed Up Work of Pest Control Men

Pest Control Operators, like everyone else, have been affected by wartime conditions. Limited manpower and other necessary restrictions have made it imperative that they speed up to complete the job.

The Acme FULL VISION Gas Mask with its Wide, Flat Safety Glass Lenses has proven most helpful in this respect. Protection against any fumigating gas, or combination of gases, is furnished.

BUY MORE WAR BONDS

ACME PROTECTION EQUIPMENT CO., INC.
Manufacturers of Respiratory Protective Devices
3616 LIBERTY AVENUE PITTSBURGH, PA.

tive and permanent oil preservative for many wood products. Set forth briefly also, are recommendations for the effective preservative treatment of lumber, poles, posts, and other forest products with Permatox A, based upon experience to date.
WRITE PESTS—BULLETIN 43-A.

FUMIGATION SAFETY RULE

Bulletin discusses importance of personal inspection of entire premises immediately before releasing gas, and offers some constructive suggestions with respect thereto.
WRITE PESTS—A C 81.

CALCIUM CYANIDE FOR RAT CONTROL

36-page booklet contains excerpts from official publications and reports of health officers throughout the world regarding use of calcilum cyanide in the control of rats. The widely differing conditions surrounding infestations, and the specific types of control for each, which are described, will serve as suggestions to health officers and others in solving similar problems.
WRITE PESTS.

DOG-CHECK

Circular describes remedy which manufacturer claims is effective for breaking dogs and cats of their undesirable habits, that rain will not wash it off, odor will last for three weeks and can be sprayed directly on new growth. Free sample if you write on your letterhead.
WRITE PESTS—NOTT CO.

SODIUM SILICO FLUORIDE

Bulletin describes sodium silico fluoride product with proper density. Effective manner of testing for presence of HCN after ventilation also discussed.
WRITE PESTS—AC 70.

Fumigation manual. 76-page manual describes safe handling and working with "Cyanegg" and on fumigation procedure and insect control. Illustrated.
WRITE PESTS—DuPONT .

GAS MASKS—RAT CONTROL PROGRAMS

Bulletin offers some pertinent suggestions regarding gas masks and how to keep them in perfect condition. It also discusses rat control programs and what the PCO can do to further them.
WRITE PESTS—AC82.

FUMIGATION SAFETY RULES

Bulletin discusses fumigation safety rules with respect to mattresses, pillows, bedding, clothing and bedroom rugs, etc.
WRITE PESTS—AC No. 79.

FUMIGATION SAFETY RULE

A review of fumigation accidents of record for 1943 shows that oversight or disregard of rule to lock all doors and accessible windows, failure to place warning signs thereon and failure to post guard during fumigation account for approximately 20% of the accidents. Bulletin discusses ways and means to eliminate accidents of this nature.
WRITE PESTS—AC No. 80.

VICTOR GLADIATOR METAL RAT TRAP

The Victor Gladiator Rat Trap is made of 22 Gauge Steel, Gun Metal finish. Equipped with strong double-coil spring made of 15 gauge oil tempered spring wire. Copper coated metal bait pedal and heavy wire work throughout. Note holes in base for nailing to floor, rafters, or wall.

The Victor Gladiator has been designed especially for professional use by public health officers, sanitary officers of the armed forces, and pest control operators. It is of rugged construction and is particularly adapted to outdoor use; especially recommended for the tropics and on shipboard, not readily affected by continuous contact with moisture.

Actual size 7⅛x3⅝x½". Weight, packed 1 dozen, 4½ lbs. Weight, packed 6 dozen, 29¼ lbs.
WRITE PESTS—VICTOR.

RESPONSE OF RATS MAINTAINED ON DIETS FUMIGATED WITH METHYL BROMIDE

Research material reprinted from Food Research.
WRITE PESTS—DOW-RESEARCH.

STANLEY'S PATENTED PIGEON-PROOFING

Economically, Permanently, Positively and **Lawfully** from any type of structure.

Stanley's Roofing & Building Service, Inc.

523 West 184th St. New York, N. Y.
Telephone: WAdsworth 7-3300-1

WIZO RAT GLUE BOARDS

Eliminate Use of Poison!
Require No Bait!

A practical and economical way to rid buildings of rodent pests! No hazards of poisoned bait . . . or of decomposition! Easy to prepare! Just place WIZO Rat Boards near rat hole or form a runway next to walls. Fasten boards to floor to prevent pulling away. Rodents are caught firmly the moment they step on the boards.

WIZO RAT GLUE can be obtained in quantities for preparing your own boards. Write for complete particulars.

ELKAY PRODUCTS CO.
323-27 West 16th St. New York, N. Y.

LOCAL ORGANIZATION NEWS

Milwaukee Pest Control Association Honors Harvey Klein

Harvey Klein, Secretary of the Milwaukee Pest Control Association, is a second Bill Buettner when it comes to hard work for the benefit of the Pest Control Industry. He is ready and willing to do anything at any time for the local pest control members, or State of Wisconsin PCO's.

At a dinner given in his honor, the Milwaukee Association members, listed below, presented him with a beautiful water-proof and shock-proof wrist watch, in appreciation of his faithful and tireless services for the past six years.

Harvey is also an outstanding amateur photographer. He was responsible for the display at the National Convention in St. Louis, where well over 100 members acquired one or more of his educational pictures to be used for display purposes in their offices.

He is a devoted husband and father of two lovely daughters. If you want Harvey to smile, just mention his wife Lorayn or his two daughters, Geraldine and Bonnie, seven and ten years old.

We all wish him continuous Happiness and Success.

Harry Hammond
John Kourt
Walter Last
Richard Murray
Jack O'Leary
Henry Turrie

A communication from Harvey Klein expresses a splendid thought which might well be read by every PCO.

I cannot help but write a few words of renewed appreciation and thanks for your part in presenting me with the beautiful watch at yesterday's luncheon at the Elk's Club.

This splendid gesture on the part of direct competitors in an industry is a fine example of the highest type of co-operation and unselfishness that is bound to make for continued progress in our industry.

Best wishes to you and yours, and again thanks.

Sincerely,
Harvey.

Washington (D.C.) Pest Control Operators

Discussion of (1) the means to maintain private enterprise, (2) the inadvisability of government going into the rat control business, etc., highlighted the informal meeting of the Washington Pest Control Operators, on June 27 at the office of the Western Exterminating Co. Other subjects include: supporting memberships, letterheads and report of the Liaison Committee.

Acting co-chairmen for the meeting were Nathaniel Madden and J. R. Fain. In keeping with the novel custom of the group to select temporary co-chairmen for the succeeding meeting—there being no regularly elected term officials—Co-chairman Madden appointed T. F. Crosby and Napoleon Silver to serve accordingly. Next meeting will be called at their discretion.

PCOs in attendance:
Owl Disinfectant Co., J. R. Fain.
Arlington Exterminators, Nathaniel Madden.
Western Exterminating Co., W. B. Walton.
The Silver Brothers, S. C. Silver, N. D. Silver.
Action Pest Control Service, V. E. Thomas.
Apex Exterminating Co., J. R. Byrne.
Theodore Meyer, H. T. Williams.
Crosley Exter. Service, T. F. Crosby.
Crosley Exter. Service, Catherine Crosby.
Capitol Chemical Co., J. S. Crook.
American Disinfectant Co., P. Calvert Cissel.

Universities and The Pest Control Industry

(Continued from Page 20)

year after year, it is obvious that the instructional group soon becomes very hard pressed to present new material each year and to avoid unprofitable repetition. Therefore, it would seem advisable that regional pest control operators' conferences be organized and scheduled on a rather long time basis. Such a scheme might call for what may be termed a "five-year-plan" in which a more or less definite program of material to be covered and methods of presentation are set up at one time to cover a period of five years. A plan of this kind would prohibit needless repetition, assure continuity and more or less guarantee a full quota of competent speakers. The teaching nucleus necessarily would be composed of the essential sponsoring group, namely the entomologists, and although subjects covering related pest control interest, such as rodent control, fungus control and structural problems, could be scheduled in advance, individual speakers in these fields would have to be chosen in accordance with the dictates of opportunity.

In conclusion, as we review the fundamental facts determining the relationship of the university to the pest control industry one particularly salient feature presents itself. This is, the universities most distinctly are not attempting to sell a plan or anything else to the industry but because of the nature of the contact of the pest control operators with the general public, they may be willing to sponsor annual educational conferences open to all operators in the region provided they are sufficiently interested to assure an attendance commensurate with the labor involved and will accord the conference unified moral support free from competitive pressure.

Answers to Multiple Choice Questions

51. Insect between molts.
52. Phototropism.
53. (2).
54. Complete metamorphosis
55. Incomplete metamorphosis
56. Complete metamorphosis
57. No metamorphosis
58. Complete metamorphosis
59. Complete metamorphosis
60. Incomplete metamorphosis
61. Incomplete metamorphosis
62. Complete metamorphosis
63. Puparium
64. Cocoon
65. Abdomen
66. Six
67. Breathing pores
68. Six
69. Ten young
70. Four months
71. 23 days
72. 25 inches
73. 25 ounces
74. 24 inches
75. Degulin

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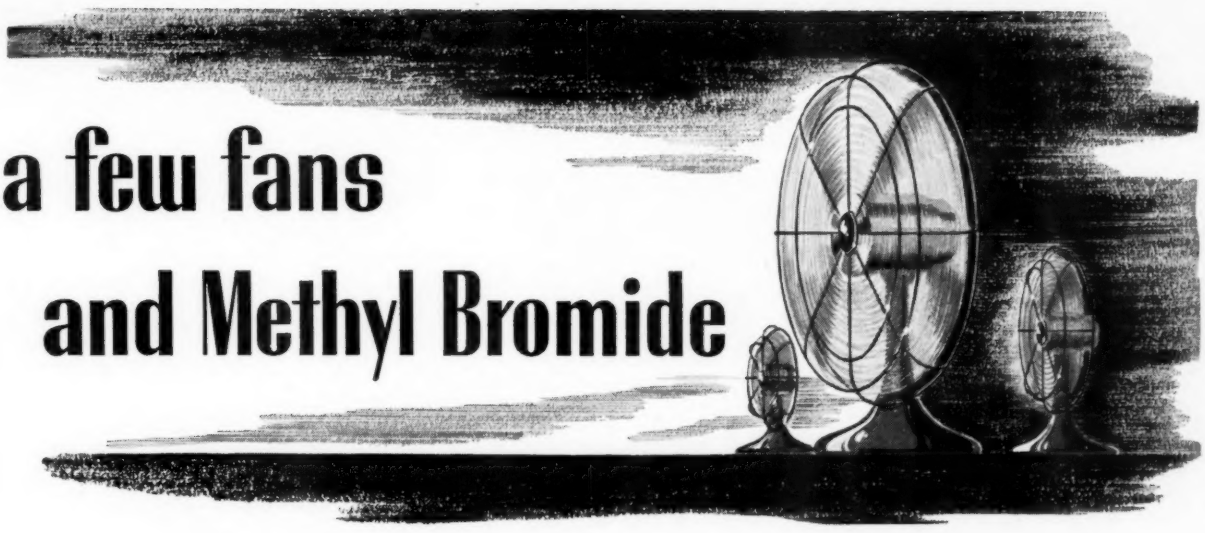

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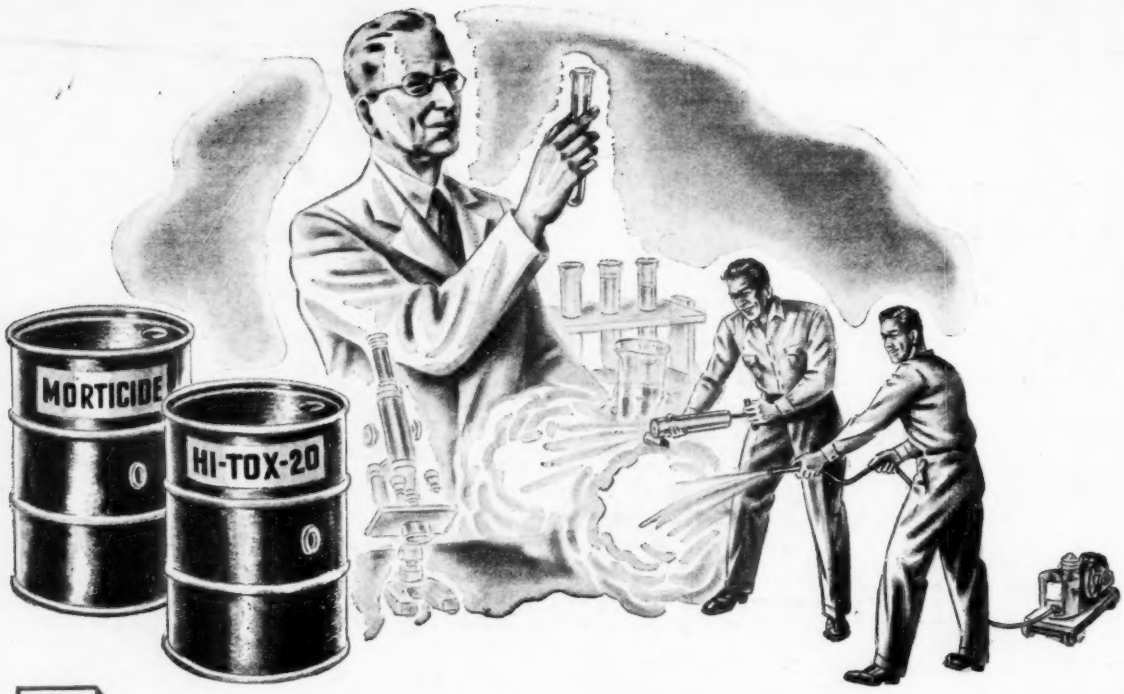

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